

# FURUNO

## OPERATOR'S MANUAL

*GPS PLOTTER*

**MODEL** *GP-1800*



**FURUNO ELECTRIC CO., LTD.**  
NISHINOMIYA, JAPAN

©FURUNO ELECTRIC CO., LTD.

9-52, Ashihara-cho,  
Nishinomiya, Japan 662

Telephone: 0798-65-2111  
Telefax: 0798-65-4200

All rights reserved.

Printed in Japan

(TATA)

PUB. No. OME-43630  
GP-1800

-Your Local Agent/Dealer

FIRST EDITION : FEB 1994  
E : APR. 19, 1995



\* 0 0 0 8 0 5 9 9 0 0 \*

\*\*\*\*\* **IMPORTANT** \*\*\*\*\*  
**Read This First**

- No single navigation aid (including this unit) should ever be relied upon as the exclusive method for navigating your vessel. The navigator is responsible for checking all aids available to confirm his position. Electronic aids are intended to assist, not replace, the navigator.
- This unit is not a fail-safe record-keeping device. Important data should be recorded in a log or saved to a memory card.
- The GPS satellites are under control of the US Department of Defense. Thus their position-fixing accuracy may be lowered without notice for security reasons.
- If an autopilot is connected with this device, the ship can be automatically steered to a destination. However, always maintain a vigilant watch to prevent collision or grounding.
- If nothing appears on the display when turning on the power, press the **TONE** key several times to raise display brilliance.
- Keep the display unit out of direct sunlight or at least shaded to maintain display tone control by avoiding an excess heat that can build up inside the cabinet.
- The **EVENT MOB** key can function to mark man overboard position, when turned on in the **DISPLAY SETUP** menu. When the key is pressed, the position at that exact moment is stored in the unit and the event mark appears at that position. The display continuously shows the range and bearing from present position to the man overboard position.

# TABLE OF CONTENTS

---

<b>1. FOREWORD .....</b>	<b>1</b>
A Word to GP-1800 Owners .....	1
Features .....	2
<b>2. ABOUT THIS MANUAL .....</b>	<b>3</b>
<b>3. SYSTEM INTRODUCTION.....</b>	<b>4</b>
<b>4. CONTROLS.....</b>	<b>5</b>
<b>5. WHAT APPEARS ON THE DISPLAY.....</b>	<b>6</b>
Plotter Displays .....	6
North-up presentation .....	6
Course-up presentation .....	7
Data Displays .....	8
Data display 1 .....	8
Data display 2 .....	8
Data display, autopilot connection .....	9
<b>6. GETTING ACQUAINTED WITH THE GP-1800 – A TUTORIAL .....</b>	<b>10</b>
Step 1: Preparation in port .....	11
Insert coastline data card .....	11
Turn on the power, adjust display brilliance and tone .....	11
Select plotter display .....	12
Mark own ship's position .....	12
Set destination .....	13
Step 2: Sailing to destination .....	13
Navigation information .....	13
How to steer to destination .....	14
Step 3: Return to port .....	14
Select your port as destination .....	14
Step 4: Quitting operation .....	14
<b>7. BASIC OPERATING PROCEDURE.....</b>	<b>15</b>
Inserting Coastline Data Card .....	15
Turning On the Power .....	16
Adjusting Brilliance and Tone of the LCD .....	16
Turning Off the Power .....	16
<b>8. THE CURSOR.....</b>	<b>17</b>

<b>9. DISPLAYING CHARTS.....</b>	<b>18</b>
Adjusting Display Scale .....	18
Display range .....	19
<b>10. SHIFTING THE DISPLAY.....</b>	<b>20</b>
Centering Ship's Position .....	20
Centering a Location .....	20
Scrolling the Display .....	20
<b>11. SELECTING DISPLAYS.....</b>	<b>21</b>
How to Select a Display .....	21
Plotter Displays .....	21
Data Displays .....	21
Presentation Mode .....	22
How to Change Presentation Mode .....	22
North-up presentation .....	22
Course-up presentation .....	22
<b>12. MENU OPERATION .....</b>	<b>23</b>
Selecting Menus .....	23
Selecting Menu Items, Registering Options .....	24
<b>13. TRACK OPERATIONS .....</b>	<b>25</b>
Stopping/Resuming Recording of Ship's Track .....	25
Setting Track Recording Interval .....	25
Procedure .....	26
Erasing Track .....	27
<b>14. WAYPOINT NAVIGATION.....</b>	<b>29</b>
Registering Waypoints .....	29
About entry of waypoints .....	29
Changing Waypoint Data .....	33
Deleting Waypoints .....	33
By the cursor .....	33
Through the waypoint list .....	33
Hiding/Showing Waypoints .....	34
Setting Destination Waypoint .....	34
By the cursor .....	34
By waypoint number .....	35
Cancelling Destination Waypoint .....	36
<b>15. ROUTE NAVIGATION .....</b>	<b>37</b>
Registering Routes .....	38
Through the route list .....	38
Changing Route Contents .....	39
Skipping route waypoints .....	39
Restoring route waypoints .....	39
Changing L/L position of route waypoints .....	40
Deleting Route Waypoints .....	40

Following a Route .....	40
By cursor-created route .....	40
By preregistered route .....	41
Cancelling a Route Navigation .....	42
<b>16. MARK OPERATIONS.....</b>	<b>43</b>
Entering Marks .....	43
Changing Mark Attributes .....	43
Mark size .....	43
Mark shape, mark tone .....	44
Connecting Marks .....	45
Erasing Marks .....	46
Individual .....	46
All marks .....	46
Marks in a specific area .....	47
<b>17. THE EVENT MOB KEY.....</b>	<b>48</b>
Enabling the MOB Function .....	49
Entering Event/MOB Position .....	49
Viewing Past Event/MOB Positions .....	49
Setting Past Event/MOB Position as Destination .....	50
Erasing Event/MOB Marks .....	50
Changing Event/MOB Mark Shape .....	50
<b>18. ALARMS.....</b>	<b>51</b>
Description of Alarms .....	51
Arrival alarm, anchor watch alarm .....	51
Cross track error (XTE) alarm, border alarm .....	52
Ship's speed alarm .....	52
Water temperature alarm .....	52
Enabling the Alarms .....	53
Deleting Aural and Visual Alarm .....	53
Disabling Alarms .....	53
<b>19. MEMORY CARD OPERATIONS.....</b>	<b>54</b>
Formatting Memory Cards .....	54
Recording Data .....	55
Write Protecting Data .....	56
Replaying Data .....	56
Deleting Recorded Data .....	57
<b>20. CHART/POSITION OFFSET.....</b>	<b>58</b>
Chart Offset .....	58
Position Offset .....	59
<b>21. DISPLAYING LORAN LOPs.....</b>	<b>60</b>
Entering LOP Offset .....	61

<b>22. CUSTOMIZING YOUR UNIT</b> .....	<b>62</b>
Procedure .....	62
Description of DISPLAY SETUP Menu .....	63
<b>23. SYSTEM SETTINGS</b> .....	<b>64</b>
Description of SYSTEM SETUP Menu .....	64
<b>24. MAINTENANCE AND TROUBLESHOOTING</b> .....	<b>70</b>
Maintenance Program .....	70
Replacement of Fuse .....	71
Replacement of Memory Card Battery .....	71
Troubleshooting Table .....	72
Self-Tests .....	73
Memory, I/O port test .....	74
Keyboard test .....	75
Test pattern .....	75
Automatic testing .....	75
GPS Receiver Check .....	76
Description of receiving status display .....	76
GPS Receiver Status Indicator .....	77
<b>25. SPECIFICATIONS</b> .....	<b>78</b>
<b>26. GEODETIC CHART LIST</b> .....	<b>80</b>

# 1. FOREWORD

---

## A Word to GP-1800 Owners

Congratulations on your choice of the FURUNO GP-1800 GPS Plotter. We are confident you will see why the FURUNO name has become synonymous with quality and reliability.

For over 40 years FURUNO Electric Company has enjoyed an enviable reputation for innovative and dependable marine electronics equipment. This dedication to excellence is furthered by our extensive global network of agents and dealers.

Your unit is designed and constructed to meet the rigorous demands of the marine environment. However, no machine can perform its intended function unless properly installed and maintained. Please carefully read and follow the operation and maintenance procedures set forth in this manual and the installation instructions contained in the installation manual.

We would appreciate hearing from you, the end-user, about whether we are achieving our purposes.

Thank you for considering and purchasing FURUNO equipment.



# Features

The GP-1800 is a totally integrated GPS Receiver and Video Plotter. It consists of an attractively styled antenna and a compact display unit.

Navigation information is displayed on a bright 8-inch LCD. On-screen information include present position, range and bearing to cursor position, range, bearing and TTG to waypoint, etc.

The main features of the GP-1800 are

- Receives and tracks eight GPS channels simultaneously to ensure high accurate position fixing and high speed trackability.
- Bright 8-inch LCD with temperature compensated tone and brilliance control.
- Menu-driven operation
- Automatic coastline chart loading.
- Position display in latitude and longitude or Loran LOPs
- Outputs steering information to FURUNO FAP-50/55/300/330 Autopilots.
- Power consumption is a low 15 W.
- Provision for connection of autopilot, providing automatic steering.
- Improved position fixing accuracy by connection of DGPS receiver (option).

## 2. ABOUT THIS MANUAL

### Manual Layout

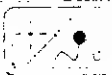

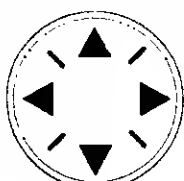
This manual is laid out in as "user-friendly" a manner as possible. It is our intention to guide the user along in the use of the gear as gently and as comfortably as possible in a series of short, easy-to-digest sections that start at a very basic level and proceed forward in complexity.

### Typographic Conventions

Before you start reading this manual, please familiarize yourself with the typographic conventions we use throughout this manual.

- Key names appear in a font different from the body text for emphasis. For example, the MENU key appears as **MENU** key.
- Several keys are labelled with a symbol rather than a name. In this instance we substitute a name for the symbol. Below is a list of these keys.

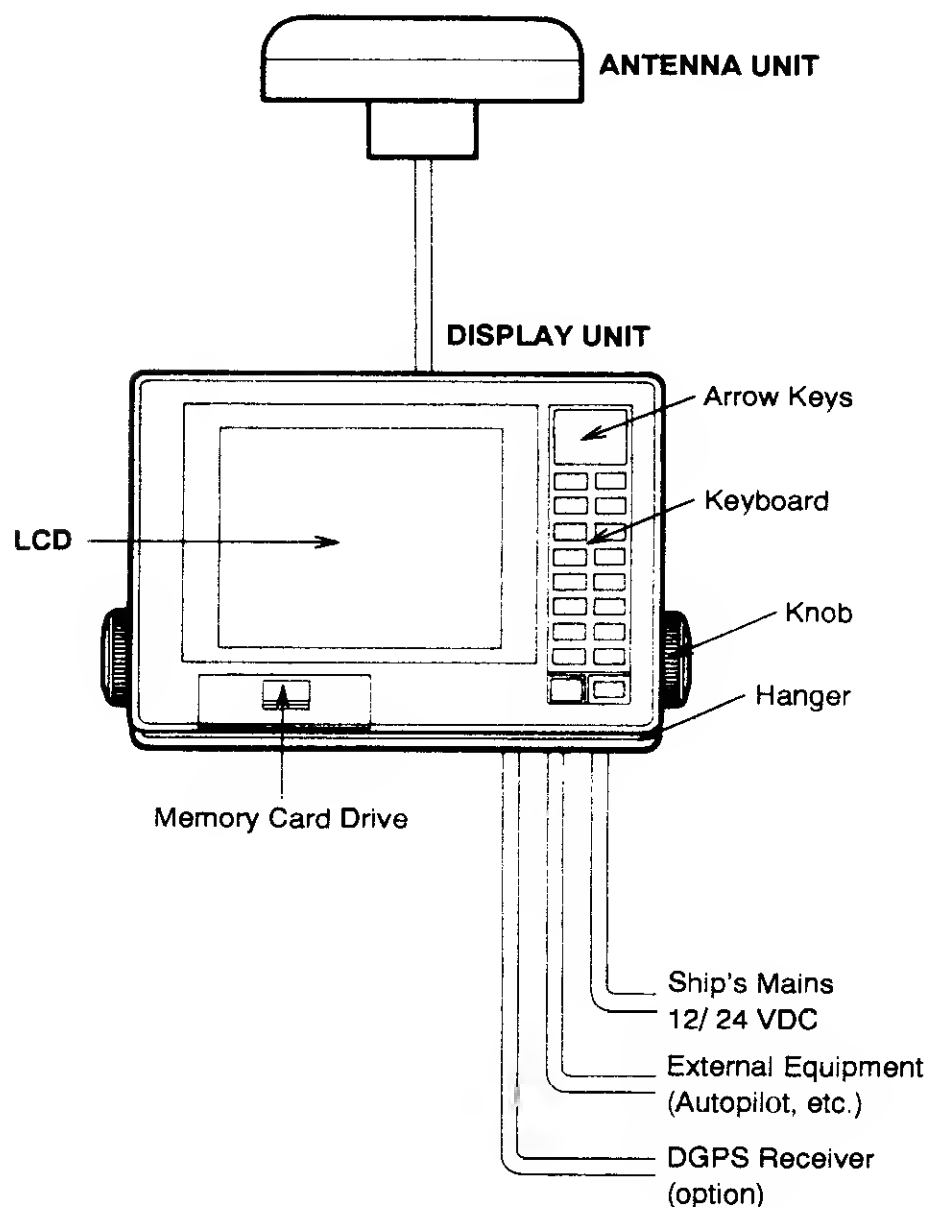
*Table 1 Key symbols and names used in text*

Key	Referred to in text as;
	Cursor key
	Scale keys
	Arrow keys

## 3. SYSTEM INTRODUCTION

### Overview

The GP-1800 GPS Plotter mainly consists of a GPS antenna and a display unit, as shown in the figure below. All operations are carried out through the front panel keys. The memory card drive loads digitized charts (option) and provides for storage and replay of RAM memory cards. An autopilot can be connected for automatic steering to destination.



*Figure 1 System configuration*

## 4. CONTROLS

### Description of Controls

All operations of the GP-1800 are carried out with the controls on the front panel of the display unit. All controls respond immediately to your command and the unit emits a beep to signify it has accepted your command. (Invalid key input emits several beeps.)

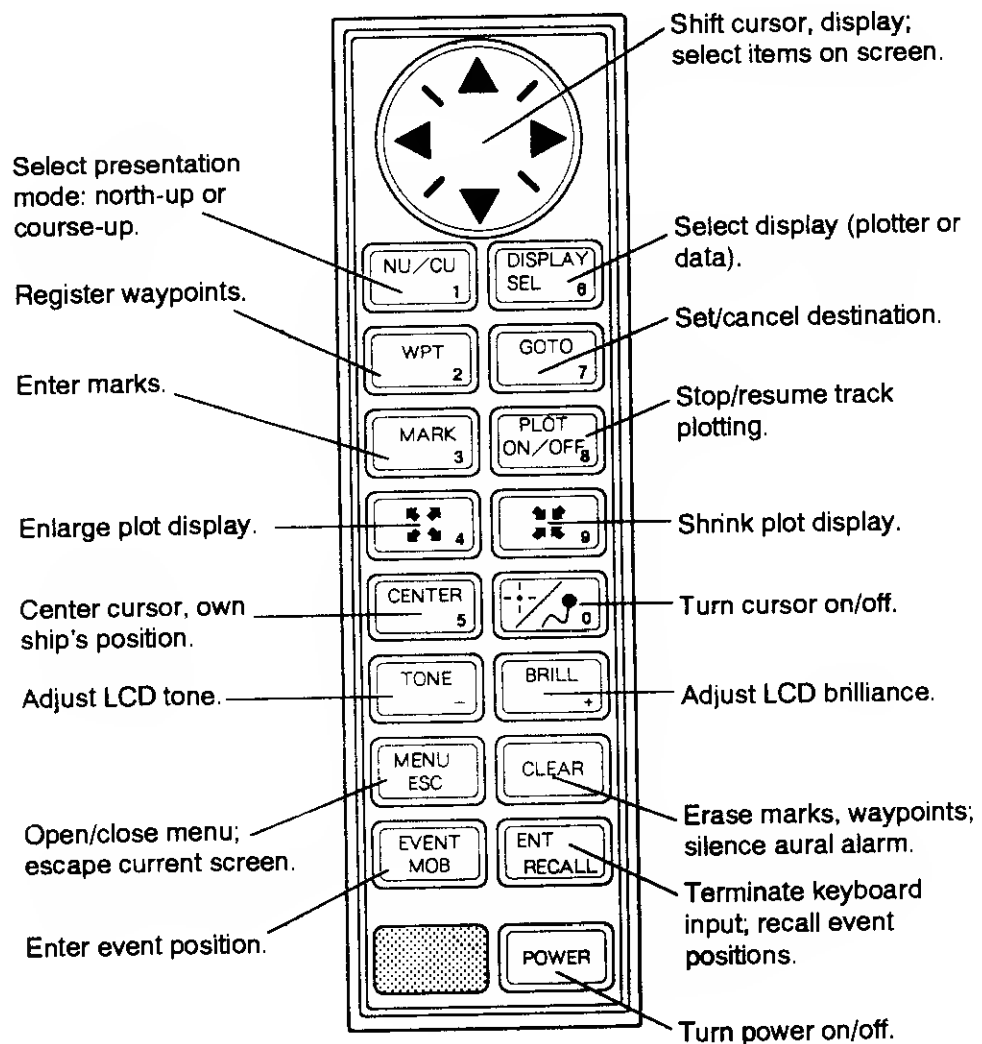


Figure 2 Front panel controls

# 5. WHAT APPEARS ON THE DISPLAY

## Overview

You may display ship's track and chart on the entire display (plotter display), or ship's track and chart on the left half of the display and navigation data on the right half (data display). Below are sample plotter and data displays.

## Plotter Displays

### North-up presentation

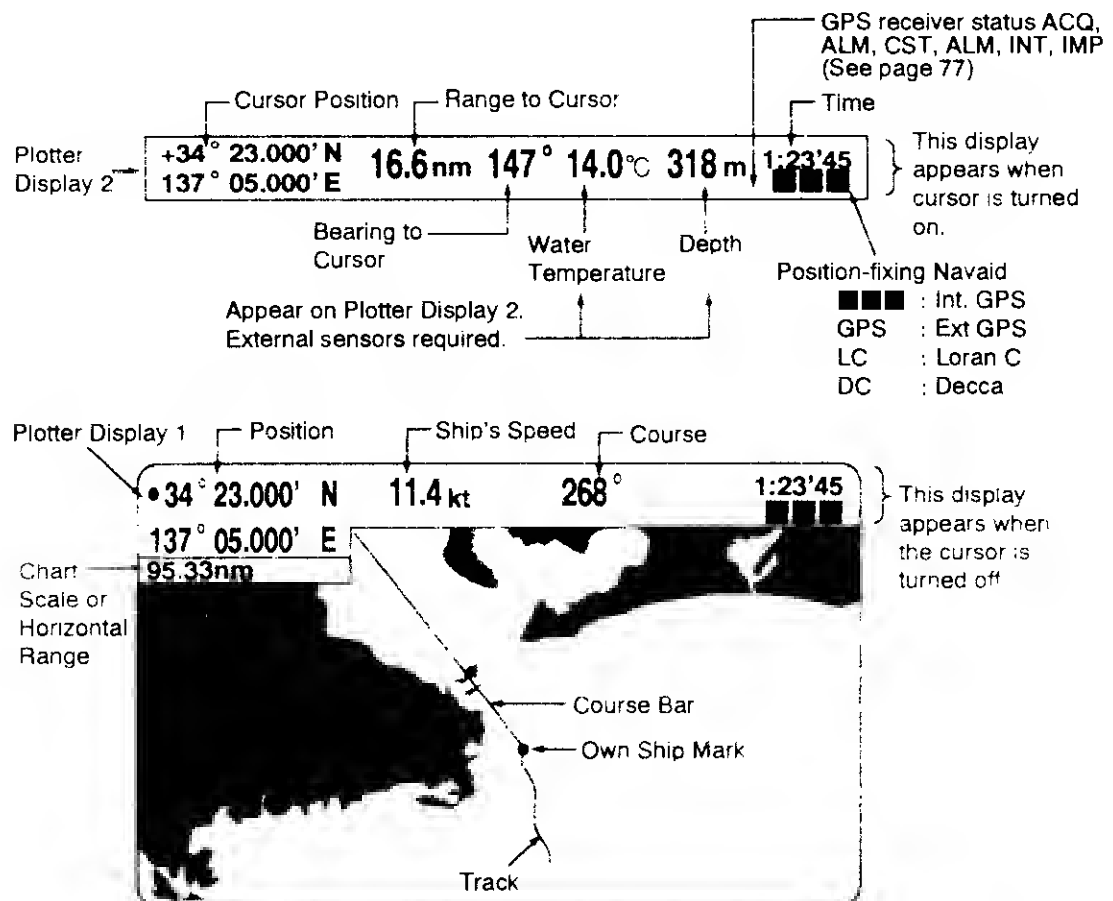


Figure 3 Plotter display, north-up presentation

## Course-up presentation

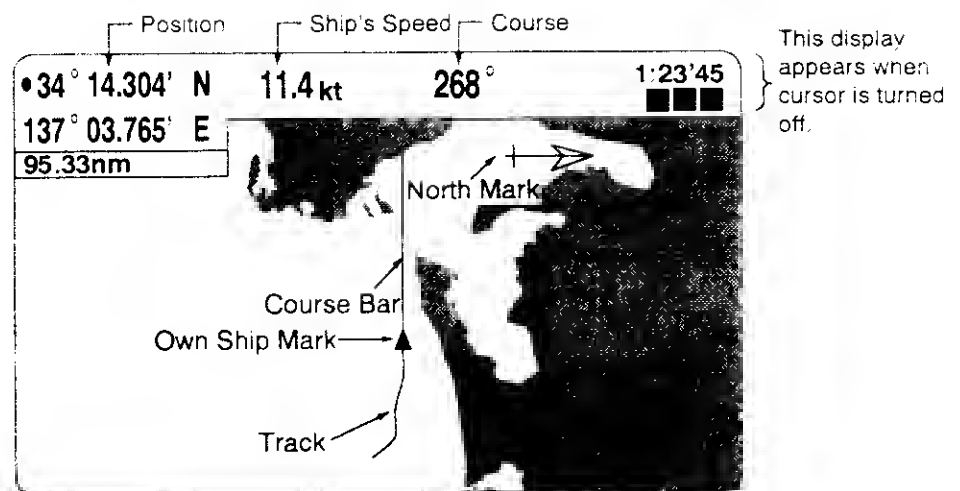


Figure 4 Plotter display, course-up presentation

■ **NOTE:** Plotter display 1 does not show water temperature or depth and range and bearing from own ship to cursor, and ship's speed and course are enlarged.

# Data Displays

## Data display 1

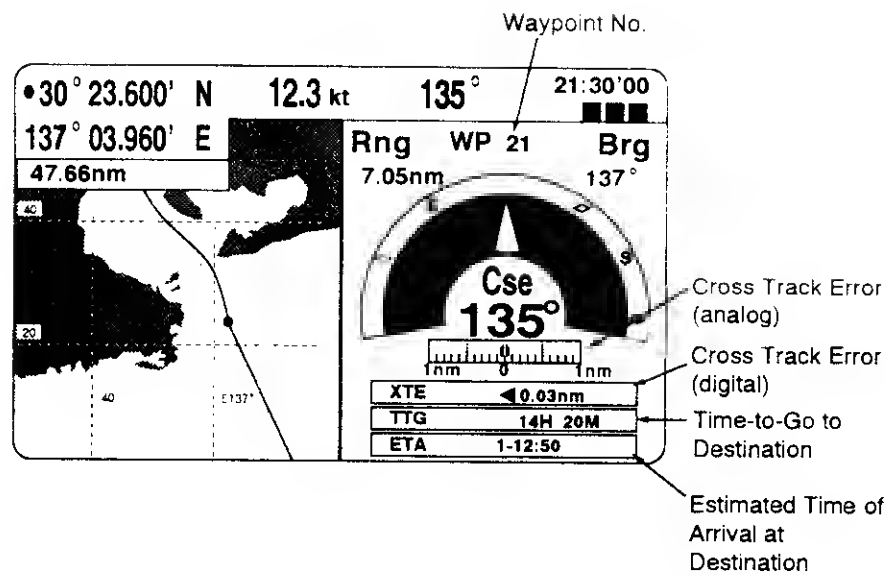
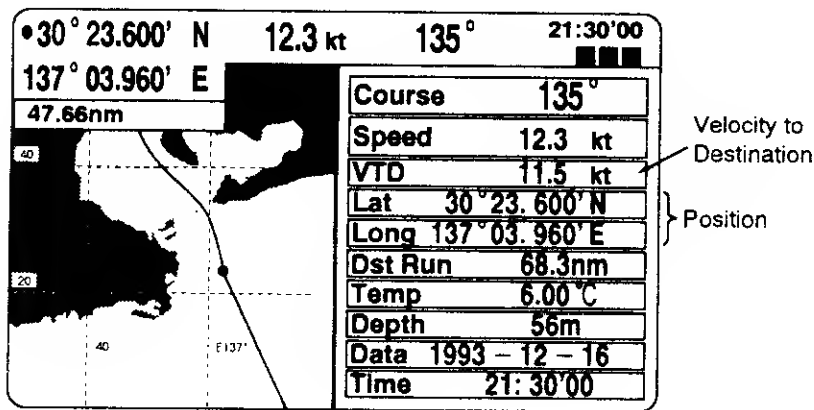


Figure 5 Data display 1

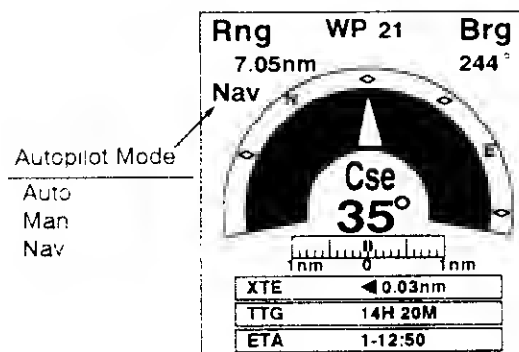
## Data display 2



Dst Run (distance run) is reset to zero by pressing the CLEAR key.

Figure 6 Data display 2

## Data display, autopilot connection



*Figure 7 Data display, autopilot FAP-300/330 connection*

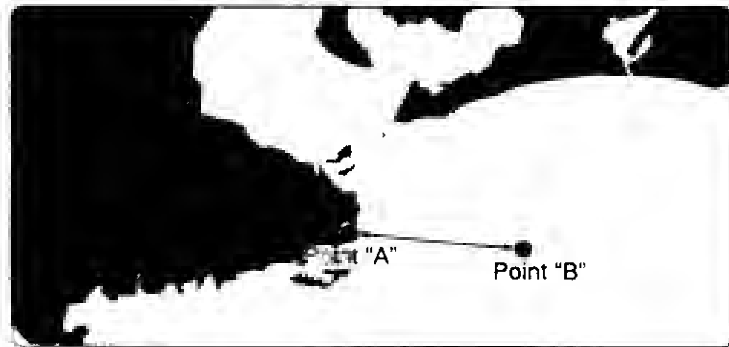


## 6. GETTING ACQUAINTED WITH THE GP-1800 – A TUTORIAL

---

### Overview

This section introduces the basic functions of your unit. You will learn how to sail from your port to a destination and return to port. For sake of illustration, the procedures which follow explain how to sail between points A and B and vice versa in Figure 8. If your unit is installed and you have time for a short cruise, try operating the unit as you review this section. Don't worry if you don't understand everything which appears on the display. You will learn more about your unit in later sections.



*Figure 8*

## Step 1: Preparation in port

### Insert coastline data card

- 1) Open the memory card drive lid.
- 2) Insert the coastline data card label side up arrow forward. Close the lid.

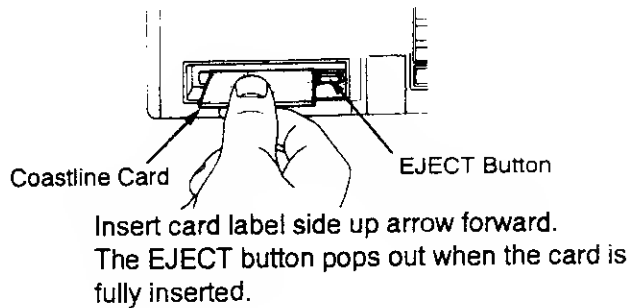


Figure 9

### Turn on the power, adjust display brilliance and tone

- 1) Press the **POWER** key.
- 2) Press either the **BRILL** or **TONE** key.
- 3) Operate the **Arrow** keys to adjust display brilliance and tone.

	[ - ]	[ + ]	[Current]
Tone	: ◀	▶	7
Brilliance	: ▼	▲	2

Figure 10

## Select plotter display

- 1) Press the **DISPLAY SEL** key and the up arrow key to select "Plotter Disp 1."
- 2) Press the **NU/CU** key to select the north-up mode.

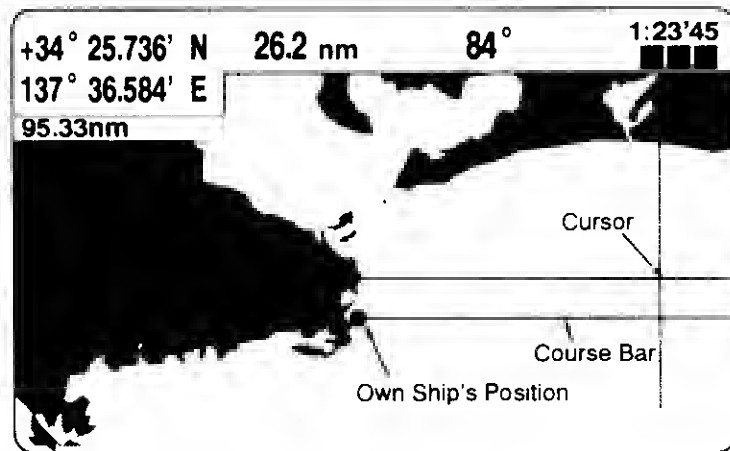


Figure 11

- 3) Press the **Cursor** key to turn off the cursor.
- 4) Press the **CENTER** key to center own position.
- 5) Press the **Scale** keys so the chart can be easily viewed.

## Mark own ship's position

This will enable you to use your current position as destination waypoint, when returning to port.

- 1) Press the **WPT** key. The display shown in Figure 12 appears.

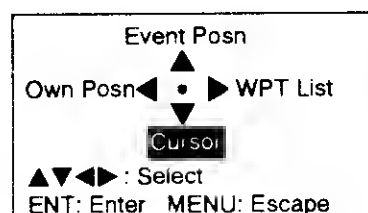


Figure 12

- 2) Press the left arrow key to select "Own Posn."
- 3) Press the **ENT** key.
- 4) Enter waypoint number. As an example, enter "01."
- 5) Press the **ENT** key.
- 6) Press the **MENU** key.

## Set destination

There are several ways by which you can set destination. Two are presented in this tutorial: by the cursor and by waypoint. First, by the cursor.

- 1) Press the **GOTO** key. The destination selection display appears.

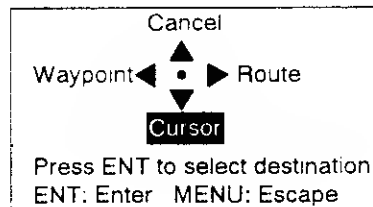


Figure 13

- 2) Press the down arrow key to select "Cursor," if it is not already selected.
- 3) Press the **ENT** key.
- 4) Operate the **Arrow** keys to set cursor on destination.
- 5) Press the **ENT** key.

## Step 2: Sailing to destination

### Navigation information

A flag marks destination and a dashed line runs between it and own ship's position, shown on the display as waypoint "00." The dashed line shows the shortest possible course to destination. Range and bearing to the destination appear at the bottom of the display.

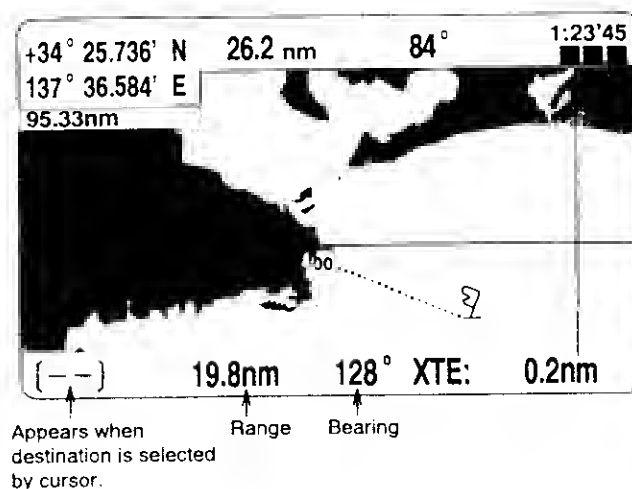


Figure 14

## How to steer to destination

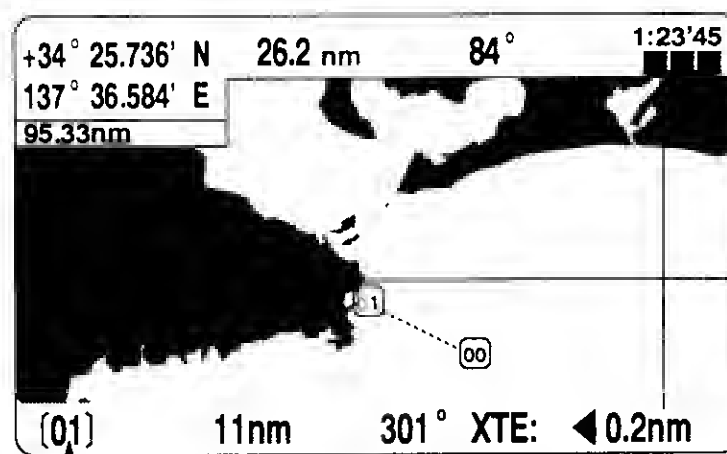
Set ship's course to be the same as the bearing of the destination. While sailing, confirm that ship's track on the display traces the dashed line. Watch the "XTE" (cross-track error) indication at the bottom right-hand corner to help stay on course. It shows the direction (by arrows) and amount (in nautical miles) to steer your boat to return to course set.

## Step 3: Return to port

### Select your port as destination

Set your port as destination, using waypoint 01, which you entered in step 1.

- 1) Press the **GOTO** key.
- 2) Press the left arrow key to select "Waypoint."
- 3) Enter waypoint "01."
- 4) Press the **ENT** key. The display would now look like Figure 15.



Waypoint No.

Figure 15

Steer ship's wheel just as in "Step 2: Sailing to destination."

## Step 4: Quitting operation

- 1) Press the **POWER** key to turn off the unit.

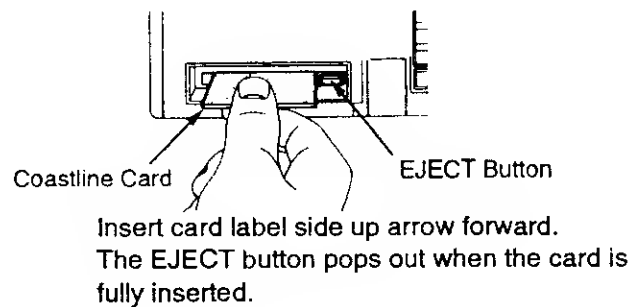
# 7. BASIC OPERATING PROCEDURE

## Overview

This section provides the information necessary for everyday start-up of the equipment.

## Inserting Coastline Data Card

- 1) Open the memory card drive lid.



*Figure 16 How to insert coastline data card*

- 2) Insert the card label side up arrow forward and close the lid.

■ **NOTE:** *Always keep the lid completely closed. Foreign material or water may damage the drive and void the warranty.*

## Turning On the Power

Press the **POWER** key. The unit proceeds in the sequence shown in the following figure. About 45 seconds after the start-up procedure is completed, the three hollow squares (appear when internal GPS feeds position data) at the top right-hand corner of the display will become filled. This means the receiver is receiving the GPS signal.

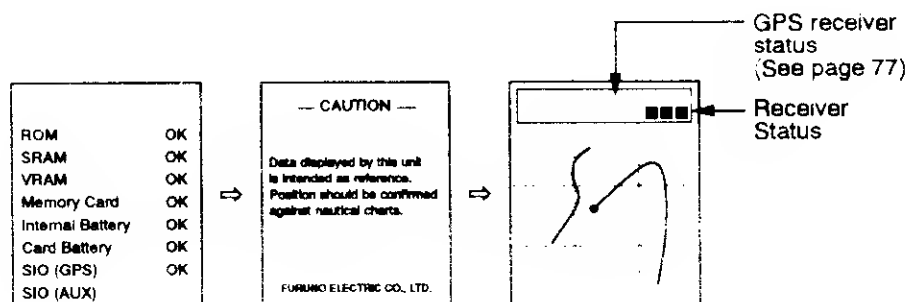


Figure 17 Sequence of start-up procedure

■ **NOTE:** It takes 3 to 10 minutes to fix your position when the unit is first installed. In this state, a GPS receiver status is indicated CST, ALM, ACQ in sequence until the three hollow squares become filled.

## Adjusting Brilliance and Tone of the LCD

- 1) Press the **BRILL** or **TONE** key.
- 2) Operate the **Arrow** keys to adjust brilliance and tone.

	[ - ]	[ + ]	[Current]
Tone	◀	▶	7
Brilliance	▼	▲	2

Figure 18 Display for adjustment of tone and brilliance

## Turning Off the Power

- 1) Press the **POWER** key.

## 8. THE CURSOR

### Function

The cursor functions to

- find latitude and longitude of a location
- find range and bearing from your ship to cursor position, and
- enter and erase marks and waypoints.

### Operation

The **Cursor** key turns the cursor on/off alternately. You can shift the cursor by operating the **Arrow** keys. The cursor moves in the direction of the key pressed.

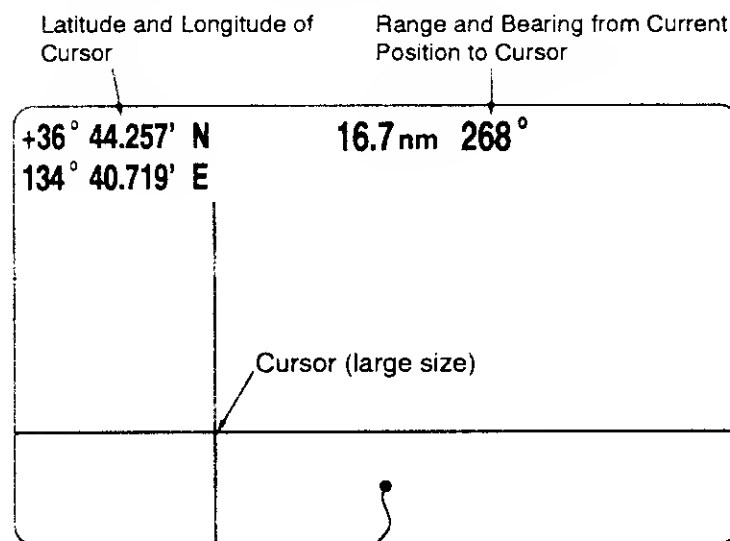


Figure 19 Display, showing cursor indications

■ **NOTE:** The size of the cursor can be set for large or small on the **DISPLAY SETUP** menu. For further details see "22. Customizing Your Unit."



## 9. DISPLAYING CHARTS






### Overview

When a proper coastline data card is inserted into the memory card drive and a suitable chart scale is selected, a land-filled coastline of your area appears. If there is no land near your ship, or a proper display scale is not selected, coastline does not appear.

### Adjusting Display Scale

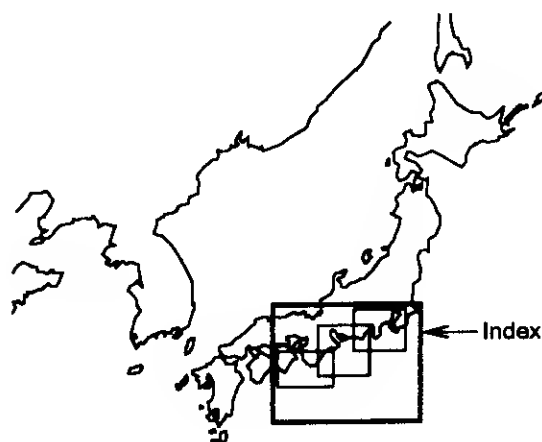
Press the **Scale** keys to adjust display scale. One of three icons appears at the left side of the display to help you select suitable chart scale.

*Table 2 Chart scale icons and their meanings*

Icon	Meaning
	Proper card is not inserted or chart scale is too small (chart is overenlarged). Press the  key to adjust chart scale.
	Chart scale is too large. Press the  key to adjust chart scale.
	Suitable chart scale is selected.

## Display range

When the **Scale** keys are pressed, you will see several frames. These frames are called indices and they show you what parts of the chart can be enlarged in the current chart scale. The areas circumscribed with smaller frames can be enlarged. The area enclosed by the largest frame cannot be enlarged.



*Figure 20 Sample chart (Japan and South Korea)*

## 10. SHIFTING THE DISPLAY

---

### Centering Ship's Position

- 1) Press the **Cursor** key to turn off the cursor if it is currently displayed.
- 2) Press the **CENTER** key.

### Centering a Location

- 1) Press the **Cursor** key to turn on the cursor if it is not currently displayed.
- 2) Operate the **Arrow** keys to set the cursor on the location you want to center.
- 3) Press the **CENTER** key.

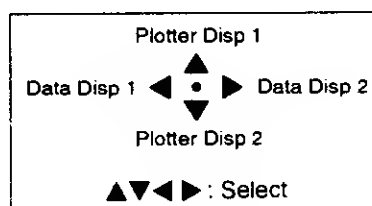
### Scrolling the Display

- 1) Press the **Cursor** key to turn off the cursor if it is currently displayed.
- 2) Operate the **Arrow** keys to scroll the display in direction desired.

# 11. SELECTING DISPLAYS

## How to Select a Display

There are four types of displays which you can select with the **DISPLAY SEL** key and **Arrow** keys.



*Figure 21 Screen for selection of display*

## Plotter Displays

These displays show chart (option) and ship's track. Two digital data display modes are available at the upper parts of the graphic display: plotter display 1 and plotter display 2.

## Data Displays

The data displays show the plotter display on the left half of the screen and a data display on the right half.

# Presentation Mode

## How to Change Presentation Mode

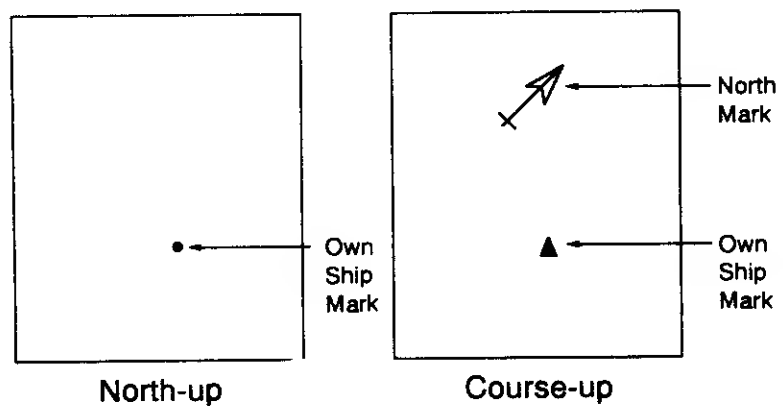
Press the **NU/CU** key, and the presentation mode changes from north-up to course-up or vice versa.

## North-up presentation

North is at the top of the display. This mode is useful for long-range navigation.

## Course-up presentation

Ship's course is at the top of the display. This mode is useful for finding course error and relation between own ship and waypoint.

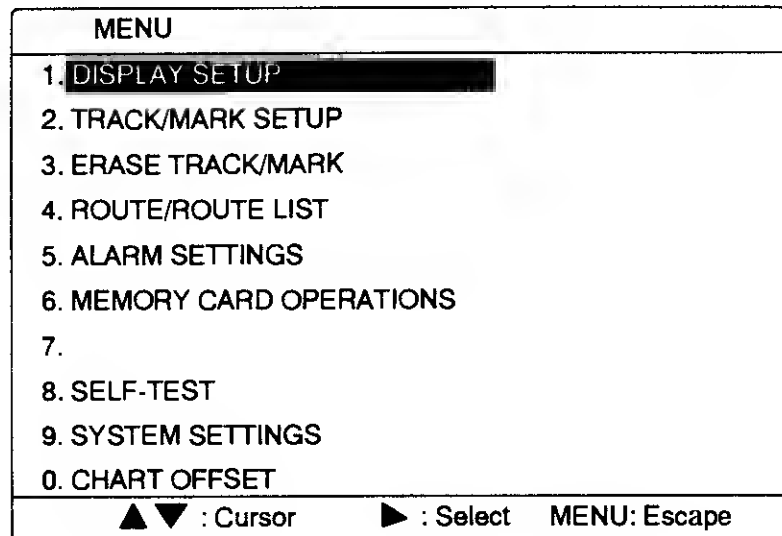


*Figure 22 North-up and course-up presentations*

# 12. MENU OPERATION

## Overview

Many functions of this unit are carried out through the menu. The main menu consists of nine menus. You may display it by pressing the **MENU** key.



*Figure 23 Main menu*

## Selecting Menus

You may select a menu one of two ways:

- by direct keyboard input of menu number, or
- operating the **Arrow** keys to display menu name in highlight and then pressing the **ENT** key.

For example, if you want to select the TRACK/MARK SETUP menu, you could press the **2** key, or operate the **Arrow** keys to highlight "TRACK/MARK SETUP" and then press the **ENT** key.

## Selecting Menu Items, Registering Options

Operate the **Arrow** keys to select both item and option. Press the **ENT** key to register selection and escape. Currently selected options are circumscribed.

TRACK/MARK SETUP			
Track Rec	Auto	Time (00'10)	Dist (00.10nm)
Mark Shape	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>
Mark Tone	<input checked="" type="radio"/> Dark	Light	
Mark Line	<input checked="" type="radio"/> .	— ... ---	
Event Mark	<input type="radio"/> <input type="radio"/> <input type="radio"/>	<input checked="" type="radio"/>	

▲▼◀▶ : Select    ENT: Enter    MENU: Escape

*Figure 24 TRACK/MARK SETUP menu*

# 13. TRACK OPERATIONS

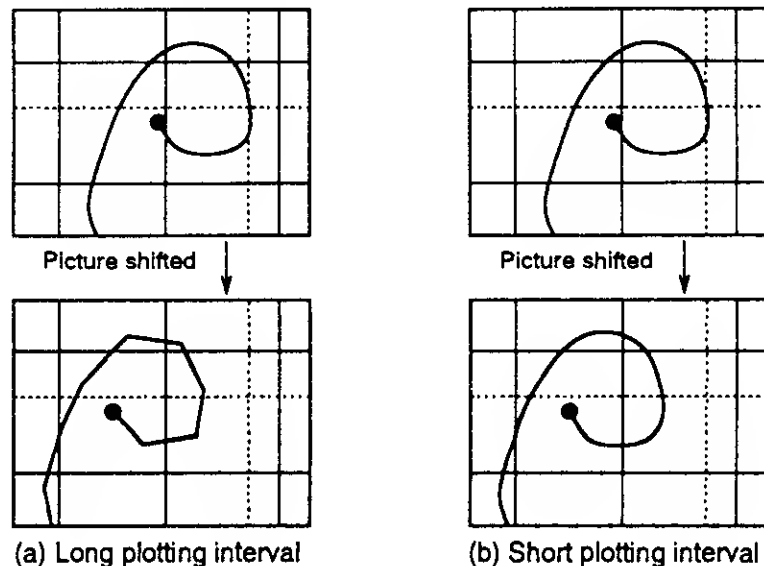
## Stopping/Resuming Recording of Ship's Track

When your boat is at anchor or returning to port you probably won't need to record its track. You can stop recording the track, to conserve the track memory, by pressing the **PLOT ON/OFF** key. The message "Stopping recording of track." appears momentarily, "H" is displayed at the left-hand side of the display and own ship mark becomes hollow. To resume recording, press the key again. The message "Resuming recording of track." appears momentarily.

## Setting Track Recording Interval

In drawing the track, first the ship's position is stored into this unit's memory at an interval of time, distance or automatic recording. A shorter interval provides better reconstruction of the track, but the storage time of the track is reduced. When the track memory becomes full, the oldest track is erased to make room for the latest.

The AUTO position is set to store ship's track every 10 seconds or 0.1 nautical miles.



*Figure 25 Track reconstruction and plotting interval*



## Procedure

- 1) Press the **MENU** key.
- 2) Press the **2** key to select "TRACK/MARK SETUP."

TRACK/MARK SETUP	
Track Rec	Auto Time (00'10) <u>Dist</u> (00.10nm)
Mark Shape	○ □ ◇ <u>×</u> ▤ ▥ •
Mark Tone	<u>Dark</u> Light
Mark Line	<u>•</u> — — — — —
Event Mark	△ ▽ ⊙ <u>☆</u>

▲▼◀▶ : Select    ENT: Enter    MENU: Escape

*Figure 26 TRACK/MARK SETUP menu*

- 3) Operate the **Arrow** keys to select Auto, Time or Dist on the "Track Rec" line.
- 4) For time or distance, enter interval. (One advantage of setting the plotting interval by distance is that you won't use the track memory when your boat is dead in water.)
- 5) Press the **ENT** key.
- 6) Press the **MENU** key to close the menu.

# Erasing Track

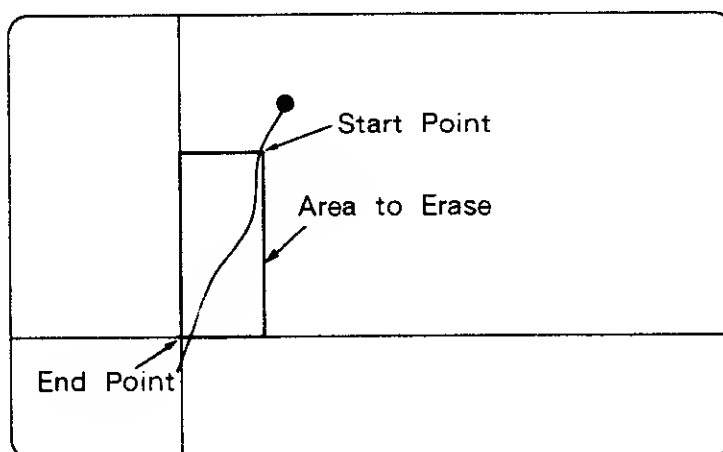
When you have been cruising for a long time and retracing the same route many times the display may become full of track. You can erase all track or a section you specify, to clear up the display.

## All track

- 1) Press the **MENU** key.
- 2) Press the **3** key to select "ERASE TRACK/MARK."
- 3) Operate the **Arrow** keys to select "Track" on the "Erase" line.
- 4) Press the **Arrow** keys to select "All" on the "Erasure Rng" line.
- 5) Press the **ENT** key.
- 6) If you are sure to erase, press the **ENT** key again.
- 7) Press the **MENU** key twice to close the menu.

## Specific track

- 1) Do steps 1 through 3 in the above procedure.
- 2) Press the **Arrow** keys to select "Area" on the "Erasure Rng" line, followed by the **ENT** key.
- 3) Operate the **Arrow** keys to place the cursor at one of the corners of the area which will enclose the track to erase.
- 4) Press the **ENT** key.
- 5) Operate the **Arrow** keys to enclose the track to erase.



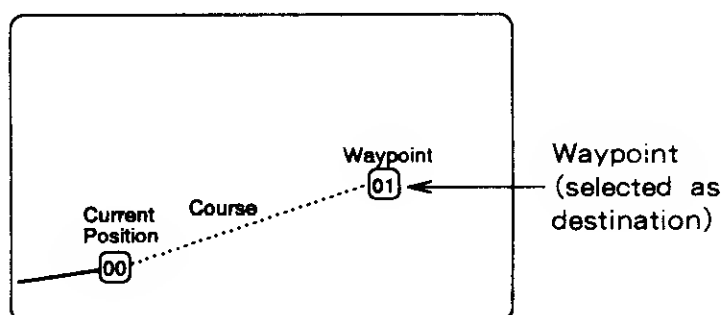
*Figure 27 How to erase track using the cursor*

- 6) Press the **ENT** key.
- 7) If you are sure to erase the track selected, press the **ENT** key.
- 8) Press any key.
- 9) Press the **MENU** key to close the menu.

# 14. WAYPOINT NAVIGATION

## Overview

In navigation terminology, a **waypoint** is a particular location on a voyage whether it be a starting, intermediate or destination point. A waypoint is the simplest piece of information the GP-1800 requires to get you to a destination, in the shortest distance possible.



*Figure 28 Waypoint 01 selected as destination*

## Registering Waypoints

### About entry of waypoints

This unit has 98 waypoints into which you can enter position information. It numbers them 01 to 98. Waypoints "00" and "99" are special waypoints. Waypoint "00" marks own ship's position when a destination is selected. Waypoint "99" is reserved for event mark position from external navaid.

There are four methods by which you can enter a waypoint:

- By event position
- By the cursor
- Through the waypoint list (manual input of latitude and longitude), or
- By own ship's position.

#### Entry by event position

- 1) Press the **WPT** key.

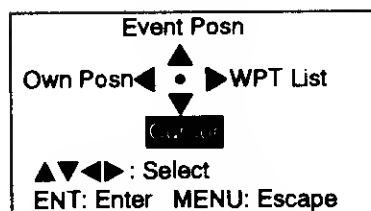


Figure 29 Display for selection of waypoint entry method

- 2) Press the up arrow key to select “Event Posn.”
- 3) Press the **ENT** key. The display shows the event data window.

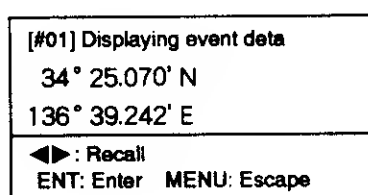


Figure 30 Display for selection of event position

- 4) Press the left arrow or right arrow key to recall desired event data.
- 5) Press the **ENT** key. The display shows the event position.

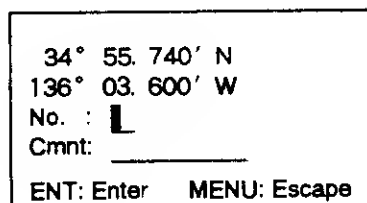
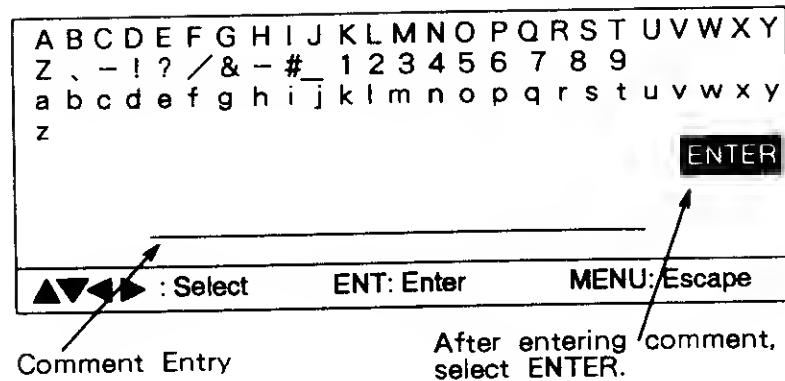


Figure 31 Display for entering waypoint number

- 6) Enter waypoint number.
  - **NOTE:** You can let your unit automatically assign waypoint number, if desired. Simply press the **ENT** key. The unit saves waypoint position information to the youngest empty waypoint.
- 7) Press the down arrow key to enter comments, if desired. The following display appears. (If you do not want to enter a comment, press the **ENT** key after entering waypoint number.)



*Figure 32 Characters available for waypoint comment*

**About comments:** You may attach a comment to waypoints during or after entry. A comment may contain up to ten characters. All comments are stored in the waypoint list. See page 32.

- 8) Operate the **Arrow** keys to select character. You can enter figures, + and - by direct keyboard input.
- 9) Press the **ENT** key.
- 10) Repeat steps **8** and **9** to complete comment.
- 11) Operate the **Arrow** keys to select "ENTER."
- 12) Press the **ENT** key twice.

#### Entry by the cursor

- 1) Press the **WPT** key.
- 2) Press the down arrow key to select "Cursor."
- 3) Press the **ENT** key.
- 4) Operate the **Arrow** keys to place the cursor on the position desired. Cursor latitude and longitude appear at the top of the display.
- 5) Press the **ENT** key.
- 6) Enter waypoint number and comments as explained above, or enter waypoint number and press the **ENT** key to register waypoint.
- 7) Press the **MENU** key to escape.

#### Entry by own ship's position

- 1) Press the **WPT** key.

- 2) Press the left arrow key to select "Own Posn."
- 3) Press the **ENT** key.
- 4) Enter waypoint number and comments as explained above, or press the **ENT** key to register waypoint.
- 5) Press the **MENU** key to escape.

### Entry through the waypoint list

- 1) Press the **WPT** key.
- 2) Press the right arrow key to select "WPT List."
- 3) Press the **ENT** key. The waypoint list appears.

WAYPOINT LIST					
No.	Lat	Long	Display	Comment	
01	34° 44. 567 'N	135° 22. 321 'W	Yes	CRAB	
02	34° 45. 567 'N	135° 23. 321 'W	Yes	LOBSTER	Route
03	-34° 46. 567 'N	135° 24. 321 'W	No	BUOY	
04	34° 47. 567 'N	135° 25. 321 'W	Yes	_____	in Use
05	° . . 'N	° . . 'W	Yes	_____	
06	° . . 'N	° . . 'W	Yes	_____	
07	° . . 'N	° . . 'W	Yes	_____	
08	° . . 'N	° . . 'W	Yes	_____	
09	° . . 'N	° . . 'W	Yes	_____	
10	° . . 'N	° . . 'W	Yes	_____	
▲▼◀▶ : Cursor    ENT: Enter    MENU : Escape					

*Figure 33 Sample waypoint list*

- 4) Press the up arrow or down arrow key to select waypoint number.
- 5) Enter latitude and longitude. (For South latitude or East longitude, press the [-] or [+] key.)
- 6) The cursor should be in the Display column and "Yes" selected. You will learn a little while later what this column means. For now, press the right arrow key once if you want to enter comments as explained above, or press the **ENT** key to register the waypoint.
- 7) Press the **ENT** key.
- 8) Press the **MENU** key twice to escape.

## Changing Waypoint Data

You may change the position and comments of waypoints you have entered, through the waypoint list.

- 1) Press the **WPT** key.
- 2) Press the right arrow key to select "WPT List."
- 3) Press the **ENT** key. The waypoint list appears.
- 4) Operate the up and down arrow keys to select waypoint number.
- 5) Operate the right and left arrow keys to select column in which to edit or add data.
- 6) Press the **ENT** key.
- 7) Press the **MENU** key twice to escape.

## Deleting Waypoints

The GP-1800 provides two ways by which you can delete waypoints:

- By the cursor, or
- Through the waypoint list.

Waypoints which are part of a route cannot be deleted except through the route list. Note that you can easily delete all waypoints by clearing the Plotter memory. More on this later.

### By the cursor

- 1) Operate the **Arrow** keys to set the cursor on the waypoint you want to delete.
- 2) Press the **CLEAR** key.

### Through the waypoint list

- 1) Press the **WPT** key.
- 2) Press the right arrow key to select "WPT List."
- 3) Press the **ENT** key. The waypoint list appears.
- 4) Operate the up and down arrow keys to select waypoint number.
- 5) Press the **CLEAR** key.
- 6) Press the **ENT** key.



## Hiding/Showing Waypoints

You may choose to hide or show waypoints on the display.

- 1) Press the **WPT** key.
- 2) Press the right arrow key to select "WPT List."
- 3) Press the **ENT** key. The waypoint list appears.
- 4) Operate the up and down arrow keys to select waypoint number.
- 5) Press the right arrow key several times to set the cursor in the "DISPLAY" column.
- 6) Press the [-] key to hide the waypoint. "No" replaces "Yes."
- 7) Press the **ENT** key.

When you want to show the waypoint, press the [ + ] key in step 6 of the above procedure.

## Setting Destination Waypoint

The GP-1800 offers four methods by which you can set destination waypoint:

- By the cursor
- By waypoint number, or
- By route number (discussed in next chapter).
- By event position (discussed in "17. THE EVEN MOB KEY")

When you select a destination waypoint, range and bearing from own ship to that point appear at the bottom of the display.

### By the cursor

Setting a destination by the cursor allows you to enter multiple points leading to the ultimate destination. In the next section you will learn how to set multiple points, and store them as a route. The procedure which follows shows you how to set ultimate destination (single point).

- 1) Press the **GOTO** key.

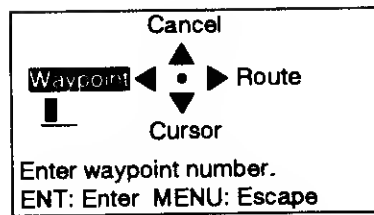


Figure 34 Display for setting destination

- 2) Press the down arrow key to select "Cursor," if it is not already selected.
- 3) Press the **ENT** key.
- 4) Operate the **Arrow** keys to set the cursor on destination.
- 5) Press the **ENT** key to set destination.

When a single destination point is selected by cursor;

- A flag marks destination and a dashed line runs between it and own ship's position.
- The range and bearing to the destination appear at the bottom of the display.

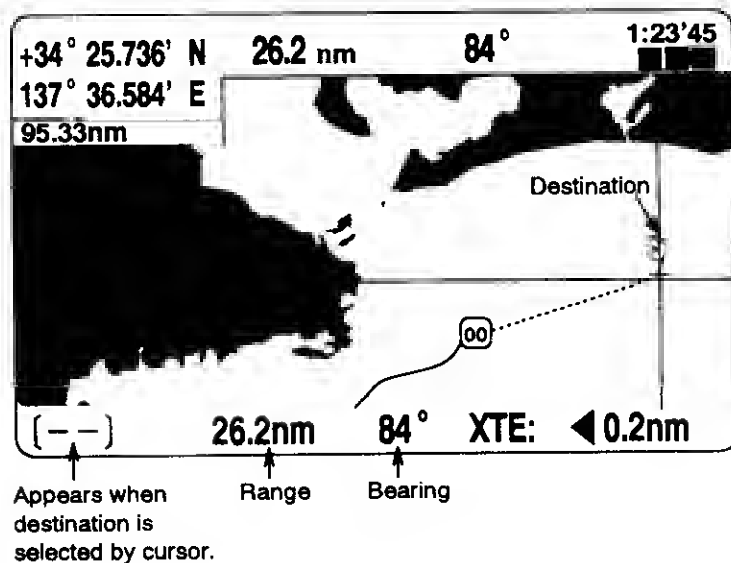


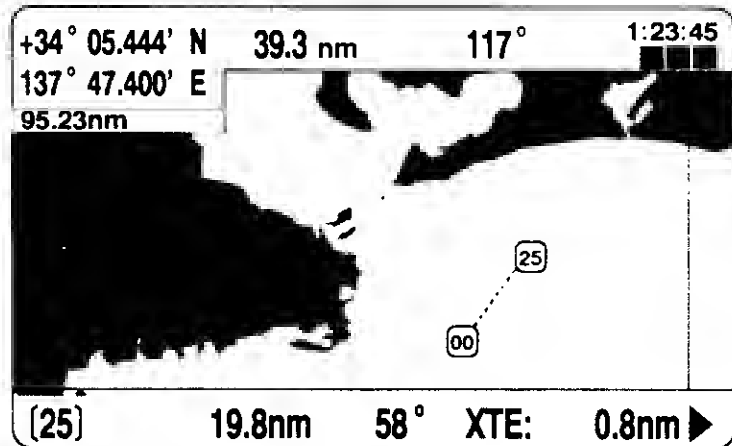
Figure 35 Sample destination waypoint data

**By waypoint number**

- 1) Press the **GOTO** key and the left arrow key to select "Waypoint."
- 2) Enter waypoint number.
- 3) Press the **ENT** key.

### When destination is selected by waypoint number;

- A dashed line runs between waypoint selected and own ship's position.
- The range and bearing to the destination appear at the bottom of the display.



*Figure 36 Sample destination waypoint data*

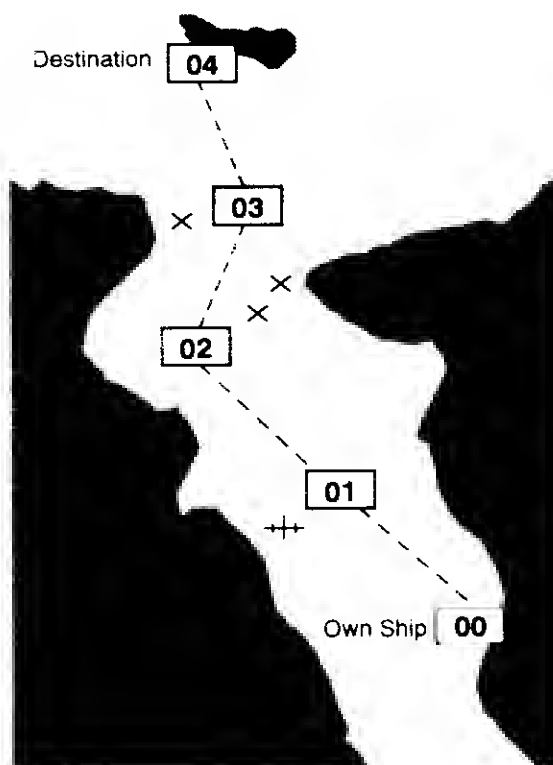
## Cancelling Destination Waypoint

- 1) Press the **GOTO** key.
- 2) Press the up arrow key to select "Cancel."
- 3) Press the **ENT** key.

# 15. ROUTE NAVIGATION

## Overview

Often a trip from one place to another involves several course changes, requiring a series of route points (waypoints) which you navigate to, one after another. The sequence of waypoints leading to the ultimate destination is called a **route**. The GP-1800 can automatically advance to the next waypoint on a route, so you do not have to change the destination waypoint repeatedly.



*Figure 37 Sample route*

## Registering Routes

You can store up to 10 routes. They are numbered from 01 to 10 on the route list. A route may consists of 30 points.

A route can be registered two ways: through the route list or by using the cursor (see "Following a Route").

### Through the route list

One advantage of this method is you can use waypoints you have already entered.

- 1) Press the **MENU** key.
- 2) Press the **4** key to select "ROUTE/ROUTE LIST."

ROUTE/ROUTE LIST				
No.	Pts.	Total Dist	TTG(H:M)	Status
01	5	1234. 56nm	62 : 69	In Use
02	10	2345. 67nm	51 : 78	
03	15	3456. 78nm	21 : 89	
04	0	0. 00nm		
05	0	0. 00nm		
06	0	0. 00nm		
07	0	0. 00nm		
08	0	0. 00nm		
09	0	0. 00nm		
10	0	0. 00nm		
▲▼ : Cursor    ► : Select    MENU : Escape				

Figure 38 ROUTE/ROUTE LIST

- 3) Press the up and down arrow keys to select route number.
- 4) Press the **ENT** key.

ROUTE/ROUTE LIST		Route: 04			
	WPT	LAT	LONG	LEG	TTG (H:M)
	01	20 34° 44. 567' N	131° 22. 320' E	0. 00nm	0:00
	02	21 35° 43. 568' N	132° 23. 321' E	78. 96nm	6:14
Minus sign means waypoint is skipped.	03	-22 36° 42. 569' N	133° 24. 322' E	89. 95nm	7:35
	04	23 37° 41. 560' N	134° 25. 323' E	98. 94nm	3:68
			.		
			.		
			.		
			.		
			.		
			.		
▲▼◀▶ : Cursor    MENU : Escape    ENT: Enter					
+ : N, E, Restore			- : S, W, Skip		

Figure 39 ROUTE/ROUTE LIST, waypoint entry display

- 5) Enter waypoint numbers in the order in which you will traverse them. (If a waypoint is already registered its position appears. Any waypoints you newly register here are also registered on the waypoint list.)

■ **NOTE:** *If you enter the waypoint number to be already registered, its position data appears. If you want to change it, enter new latitude and longitude position.*

- 6) Press the down arrow key.

■ **NOTE:** *The Time-To-Go between legs on the route is calculated based on the trial speed entered on page 2 of the route. To go to page 2, select route point 01 (or 16) and press the up arrow key (down arrow key). The default speed is 10 knots.*

- 7) Press the **ENT** key.

- 8) Press the **MENU** key twice.

## Changing Route Contents

### **Skipping route waypoints**

To skip a route waypoint;

- 1) Press the **MENU** key.
- 2) Press the **4** key.
- 3) Press the up and down arrow keys to select route number.
- 4) Press the **ENT** key.
- 5) Press the **Arrow** keys to select the route waypoint you want to skip.
- 6) Press the **[-]** key to skip that point temporarily. A minus sign appears to the left of route waypoint.
- 7) Press the **ENT** key.
- 8) Press the **MENU** key twice to close the menu.

### **Restoring route waypoints**

When you want to restore a route waypoint, press the **[ + ]** key in step 6 in the above procedure to erase the minus sign.

## Changing L/L position of route waypoints

- 1) Press the **MENU** key.
- 2) Press the **4** key.
- 3) Press the up and down arrow keys to select route number.
- 4) Press the **ENT** key.
- 5) Press the **Arrow** keys to set the cursor in the LAT (or LONG) column of the route point you want to change position.
- 6) Enter new latitude/longitude position.
- 7) Press the **ENT** key.
- 8) Press the **MENU** key twice to close the menu.

## Deleting Route Waypoints

- 1) Press the **MENU** key.
- 2) Press the **4** key.
- 3) Press the up and down arrow keys to select route number.
- 4) Press the **ENT** key.
- 5) Press the up and down arrow keys to select route waypoint which you want to delete.
- 6) Press the **CLEAR** key.
- 7) Press the **ENT** key.
- 8) Press the **MENU** key twice to close the menu.

## Following a Route

Following a route is the process by which you use a registered route for navigation. This unit displays navigation information to guide you from one waypoint to the next, as it automatically switches from one waypoint to another in sequence.

### By cursor-created route

- 1) Press the **GOTO** key.
- 2) Press the down arrow key to select "Cursor," if it is not already selected.
- 3) Press the **ENT** key.
- 4) Press the **Arrow** keys to set the cursor on waypoint.

- 5) Press the [ + ] key to enter the first waypoint. (You can clear a waypoint by pressing the [ - ] key.)
- 6) Repeat steps 4 and 5 to complete the route.
- 7) Press the **ENT** key.
- 8) Enter route number.

■ **NOTE:** *If you do not want to store the route permanently, press the **ENT** key to escape.)*

- 9) Press the **ENT** key.

Flags mark route waypoints and a dashed line connects all route waypoints including own ship's position. The range and bearing to the first waypoint appear at the bottom of the display.

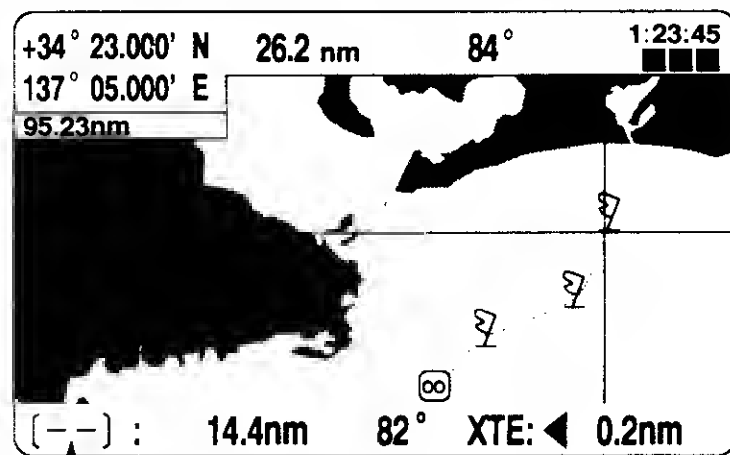


Figure 40 Appearance of cursor-created route selected for navigation

### By preregistered route

- 1) Press the **GOTO** key.
- 2) Press the right arrow key to select "Route."
- 3) Enter route number.
- 4) If you want to navigate the waypoints of the route in the reverse order in which they were entered, press the [ - ] key.
- 5) Press the **ENT** key.

A dashed line connects all waypoints including own ship's position. Range and the bearing to the first waypoint appear at the bottom of the display.



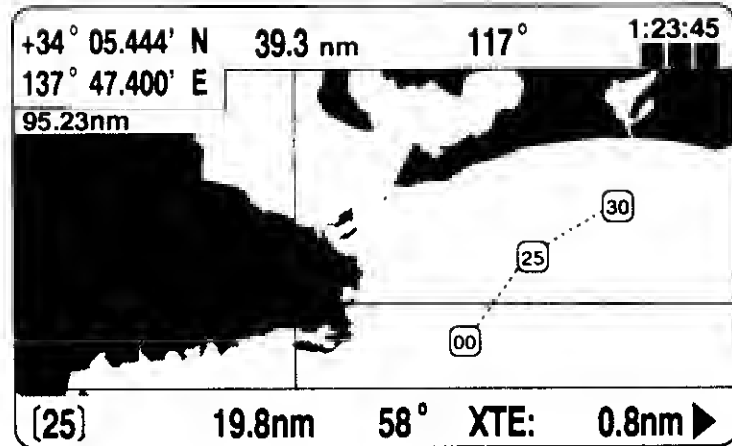


Figure 41 Appearance of waypoint-created route selected for navigation

## Cancelling a Route Navigation

- 1) Press the **GOTO** key.
- 2) Press the up arrow key to select "Cancel."
- 3) Press the **ENT** key.

■ **NOTE:** For cursor-created registered routes, waypoint "flags" remain on the screen after cancelling route navigation. If you do not require the route and want to erase the flags, delete all route waypoints of the route through the route list.

# 16. MARK OPERATIONS

## Overview

You can inscribe marks on the display to denote important locations; for example, buoy, fishing point, wreck. Further, marks can be connected with lines to mark important areas such as a hot fishing spot or danger area.

## Entering Marks

- 1) Press the **Cursor** key to turn on the cursor.
- 2) Press the **Arrow** keys to set the cursor on location desired.
- 3) Press the **MARK** key.

## Changing Mark Attributes

You may change the size, shape and tone of the mark.

### Mark size

- 1) Press the **MENU** key.
- 2) Press the **1** key to select "DISPLAY SETUP."

DISPLAY SETUP				▼ : Next Page
Display	Normal	Reverse		
Land Pattern:	Dark	Med	Light	OFF
Place-Name	Dark	Light	OFF	
Grid	Dark	Light	OFF	
Course Bar	Dark	Light	OFF	
Time Mark	Dark	Light	OFF	
MOB Data	ON	OFF		
Waypoint Mark Size	Large	Small		
Mark Size	Large	Small		
Cursor Size	Large	Small		
▲▼◀▶ : Select    ENT: Enter    MENU: Escape				

Figure 42 DISPLAY SETUP menu

- 3) Operating the **Arrow** keys, select "Mark Size" and "Large" or "Small."
- 4) Press the **ENT** key.
- 5) Press the **MENU** key.

### Mark shape, mark tone

- 1) Press the **MENU** key.
- 2) Press the **2** key to select "TRACK/MARK SETUP."

TRACK/MARK SETUP	
Track Rec	Auto Time (00'10) Dist (00.10nm)
Mark Shape	○ □ ◇ <b>×</b> ▣ ▤ •
Mark Tone	<b>Dark</b> Light
Mark Line	• — — — — —
Event Mark	△ ▽ ⊙ <b>☆</b>

▲▼◀▶ : Select    ENT: Enter    MENU: Escape

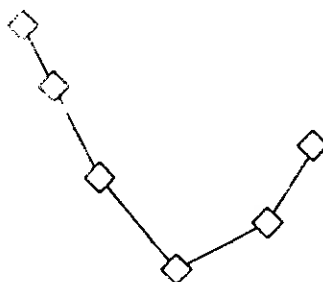
Figure 43 TRACK/MARK SETUP menu

- 3) Operating the **Arrow** keys, select "Mark Shape" and shape desired.
- 4) Operate the **Arrow** keys to select "Mark Tone" and tone desired.
- 5) Press the **ENT** key.
- 6) Press the **MENU** key.

## Connecting Marks

Marks can be connected with solid or dashed lines. This feature is useful for denoting important areas. You can even construct your own charts, and save to them to a memory card for future replay.

- 1) Press the **MENU** key.
- 2) Press the **2** key to select "TRACK/MARK SETUP."
- 3) Operate the **Arrow** keys to select "Mark Line" to other than "single dot."
- 4) Press the **ENT** key.
- 5) Press the **MENU** key to close the menu.
- 6) Press the **Arrow** keys to place the cursor on location desired for mark.
- 7) Press the **MARK** key.
- 8) Repeat steps 6 and 7 to continue entering marks.



*Figure 44 Marks connected with lines*

To return to individual entry of marks, set "Mark Line" to "single dot" in step 3 of the above procedure.

## Erasing Marks

Marks can be erased individually, collectively, or within an area you specify.

## Individual

- 1) Press the **Cursor** key to turn on the cursor.
- 2) Press the **Arrow** keys to place the cursor on the mark to erase.
- 3) Press the **CLEAR** key.


**All marks**

- 1) Press the **MENU** key.
- 2) Press the **3** key to select "ERASE TRACK/MARK."

ERASE TRACK/MARK		
Erase	Track	Mark Track+Mark
Erase Rng	No	All Area

Track Pts Used : 1984/2000Pt  
Mark Pts Used : 5/2000Pt

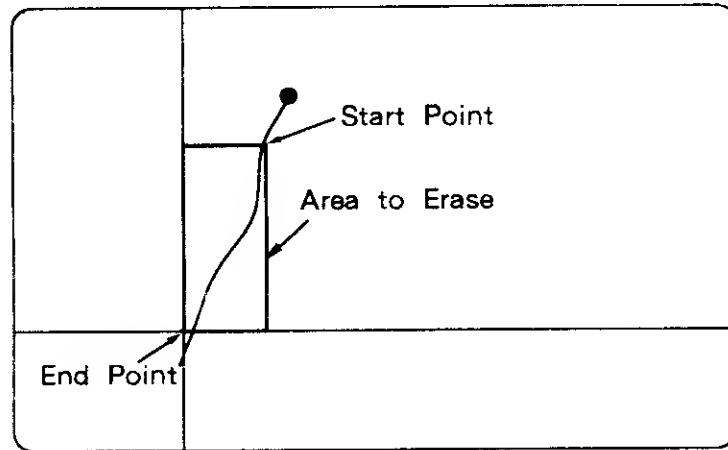
 : Select
ENT: Enter
MENU: Escape

*Figure 45 ERASE TRACK/MARK menu*

- 3) Operate the **Arrow** keys to select "Mark" on the "Erase" line.
- 4) Press the down arrow key once.
- 5) Press the right and left arrow keys to select "All."
- 6) Press the **ENT** key.
- 7) If you are sure to erase, press the **ENT** key again.
- 8) Press the **MENU** key twice to close the menu.

## Marks in a specific area

- 1) Do steps 1 through 3 in the previous procedure.
- 2) Press the **Arrow** keys to select "Area" on the "Erasure Rng" line.
- 3) Operate the **Arrow** keys to place the cursor at one of the corners of the area which will enclose the marks to erase.
- 4) Press the **ENT** key.
- 5) Operate the **Arrow** keys to enclose the marks to erase.



*Figure 46 How to erase marks using the cursor*

- 6) Press the **ENT** key.
- 7) If you are sure to erase the marks selected, press the **ENT** key.
- 8) Press any key.
- 9) Press the **MENU** key to close the menu.

# 17. THE EVENT MOB KEY

## Overview

### Basic function

The **EVENT MOB** key saves present position. When the key is pressed the GP-1800 saves present position at that moment and displays the event mark at that position. This key can function to save present position as either an "event position" or MOB (Man Over Board) position.

### MOB function

The MOB function can be enabled on the DISPLAY SETUP menu. When enabled, the range and bearing to the MOB position are continuously updated on the display, to help you navigate to the MOB position.

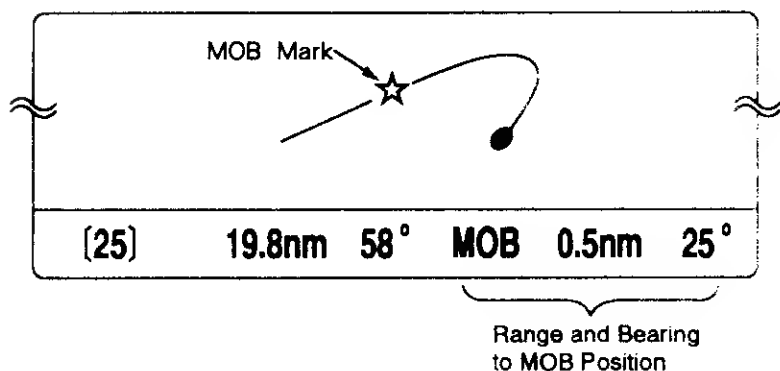
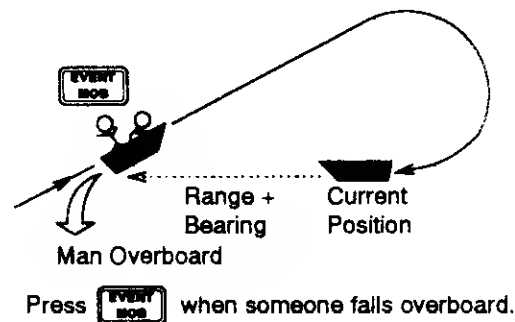


Figure 47 The MOB function

### Event/MOB storage capacity

You may enter 99 event/MOB positions. The GP-1800 saves and numbers them from 01-99, 01 being the latest event/MOB position. When the event position memory is full the oldest event/MOB position is erased to make room for the latest.

## Enabling the MOB Function

- 1) Press the **MENU** key.
- 2) Press the **1** key to display the DISPLAY SETUP menu.
- 3) Press the **Arrow** keys to display "MOB DATA ON."
- 4) Press the **ENT** key.
- 5) Press the **MENU** key.

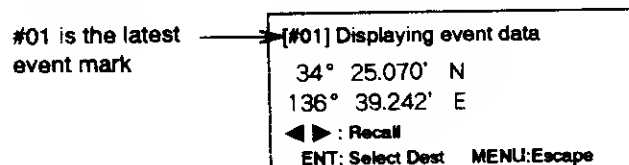
## Entering Event/MOB Position

Press the **EVENT MOB** key when you want to enter an event position/MOB position. The indication "Memorized event position" and position appear at the bottom left-hand corner of the screen and the position is marked on the display in current event mark type. For MOB position, range and bearing to it are shown.

## Viewing Past Event/MOB Positions

You can view past event mark position information as follows.

- 1) Press the **ENT RECALL** key.



*Figure 48 Event/MOB position display*

- 2) Press the right and left arrow keys to display position number desired. You can press and hold down those keys to change the display faster.
- 3) Press the **MENU** key to escape.



## Setting Past Event/MOB Position as Destination

- 1) Press the **ENT RECALL** key.
- 2) Press the right and left arrow keys to display position number desired.
- 3) Press the **ENT** key.

## Erasing Event/MOB Marks

- 1) Press the **Cursor** key to turn on the cursor, if it is not currently displayed.
- 2) Press the **Arrow** keys to place the cursor on the event/MOB mark you want to erase.
- 3) Press the **CLEAR** key.

## Changing Event/MOB Mark Shape

- 1) Press the **MENU** key.
- 2) Press the **2** key to select "TRACK/MARK SETUP."
- 3) Press the **Arrow** keys to select "Event Mark Shape" and shape desired.
- 4) Press the **ENT** key.
- 5) Press the **MENU** key to close the menu.

## Description of Alarms

There are eight conditions which generate both aural and visual alarms in this unit.

### Arrival alarm, anchor watch alarm

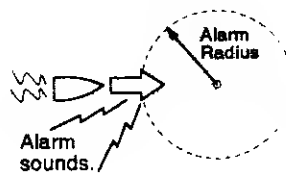
#### Arrival alarm

The arrival alarm informs you that your boat is approaching a destination waypoint. The area that defines an arrival zone is that of a circle which you approach from the outside of the circle. The alarm will be released if your boat enters the circle.

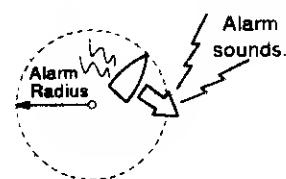
#### Anchor watch alarm

The anchor watch alarm sounds to warn you that your ship is moving when it should be at rest.

#### ■ Arrival Alarm



#### ■ Anchor Watch Alarm



*Figure 49 How the arrival and anchor watch alarms work*

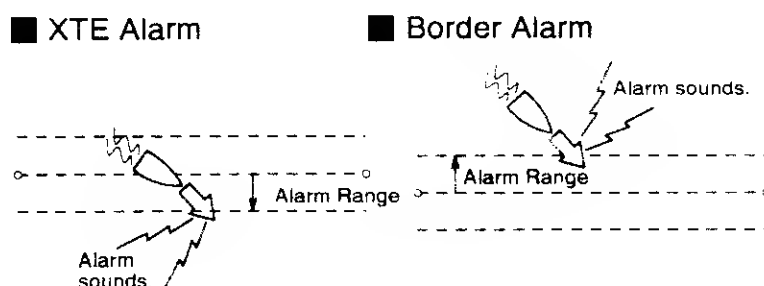
### **Cross track error (XTE) alarm, border alarm**

#### **XTE alarm**

The XTE alarm warns you when your ship is off its intended course.

#### **Border alarm**

The border defines an area, comprised of a starting and destination waypoint, which you do not want your boat to cross. The alarm sounds when the boat crosses the area defined by the two waypoints.



*Figure 50 How the XTE and border alarms work*

### **Ship's speed alarm**

The ship's speed alarm sounds when your ship's speed is within (or over) the alarm range set.

### **Water temperature alarm**

The water temperature alarm sounds when the water temperature is within (or over) the preset temperature range. This alarm is useful for searching for specific species of fish, since each species of fish has its own habitable water temperature. (This alarm requires connection of a water temperature sensor.)

## Enabling the Alarms

- 1) Press the **MENU** key.
- 2) Press the **5** key to select "ALARM SETTINGS."

ALARM SETTINGS			
Arrival Anchor	Arrival	Anchor	OFF
Alarm Range	00. 500nm		
XTE/Border	XTE	Border	OFF
Alarm Range	00. 250nm		
Ship Speed	Within	Over	OFF
Speed Range	10. 0kt~12.0kt		
Water Temperature	Within	Over	OFF
Temp Range	+11.0~+15.0°C		

▲▼◀▶: Select    ENT: Enter    MENU: Escape

Figure 51 ALARM SETTINGS menu

- 3) Operate the **Arrow** keys to select alarm desired.
- 4) Press the down arrow key once.
- 5) Enter alarm range.
- 6) Press the **ENT** key.
- 7) Press the **MENU** key to close the menu.

## Deleting Aural and Visual Alarms

When an alarm setting is exceeded, both aural and visual alarms are released. You can silence the aural alarm by pressing the **CLEAR** key. To erase the visual alarm, press the **CLEAR** key again. The speaker mark remains on the display until the alarm setting is no longer violated.

## Disabling Alarms

Select "Off" in step 3 in "Enabling the Alarms" and then press the **ENT** and **MENU** keys.

# 19. MEMORY CARD OPERATIONS

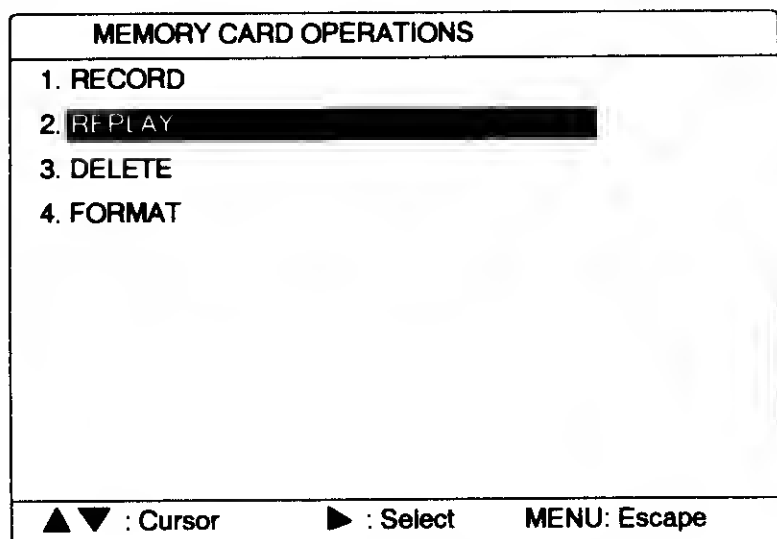
## Overview

This chapter shows you how to use the optional RAM memory cards.

## Formatting Memory Cards

Before you can use a memory card it must be formatted. Formatting prepares the card for use with the system.

- 1) Insert a new memory card into the memory card drive label side up arrow pointing forward.
- 2) Press the **MENU** key.
- 3) Press the **6** key to select "MEMORY CARD OPERATIONS."



*Figure 52 MEMORY CARD OPERATIONS menu*

- 4) Press **4** to select "Format."
- 5) Press the **ENT** key to format the card.
- 6) Press the **MENU** key twice to close the menu.

## Recording Data

- 1) Press the **MENU** key.
- 2) Press the **6** key to select "MEMORY CARD OPERATIONS."
- 3) Press the **1** key to select "Record."

RECORD		
Track	<input checked="" type="checkbox"/> YES	<input type="checkbox"/> NO
Mark/ Line	<input checked="" type="checkbox"/> YES	<input type="checkbox"/> NO
Waypoint/ Route	<input checked="" type="checkbox"/> YES	<input type="checkbox"/> NO
Initial Data	<input checked="" type="checkbox"/> YES	<input type="checkbox"/> NO

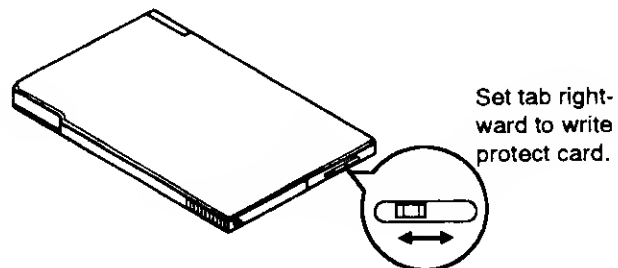
▲▼◀▶ : Cursor      ENT: Enter      MENU : Escape

*Figure 53 RECORD menu*

- 4) Operate the **Arrow** keys to choose items to record.
- 5) Press the **ENT** key.
- 6) Press the **ENT** key again to make a new file. (You may write over an existing file if you wish; press the up and down arrow keys to select file and press the **ENT** key twice.)
- 7) Enter file name, using up to 16 characters. Press **Arrow** keys to select character and then press the **ENT** key. Repeat to complete file name. (Figures, + and - may be entered by direct keyboard input.)
- 8) Select "ENTER" and press the **ENT** key.

## Write Protecting Data

The memory card contains a switch which can prevent writing of information to the card. This prevents accidental erasure of important information. To write protect a memory card, set the switch at the base of the card rightward as shown in figure below.



*Figure 54 Location of writing enable/disable switch on memory card*

## Replaying Data

Data stored on a memory card can be replayed on the display. This feature is useful for analyzing past track, restoring menu settings, displaying user-constructed charts, etc.

- 1) Press the **MENU** key.
- 2) Press the **6** key to select "MEMORY CARD OPERATIONS."
- 3) Press the **2** key to select "Replay."
- 4) Operate the up and down arrow keys to choose items to replay.
- 5) Press the **ENT** key.
- 6) Press the up and down arrow keys to select file.
- 7) Press the **ENT** key.

## Deleting Recorded Data

Unwanted data on memory card files can easily be deleted.

- 1) Press the **MENU** key.
- 2) Press the **6** key to select "MEMORY CARD OPERATIONS."
- 3) Press the **2** key to select "DELETE."
- 4) Operate the up and down arrow keys to choose items to delete.
- 5) Press the **ENT** key.
- 6) Press the up and down arrow keys to select file.
- 7) Press the **ENT** key.



## 20. CHART/POSITION OFFSET


### Chart Offset

In some instances chart position may be off by a few minutes. For example, the position of the ship is shown to be at sea while it is in fact moored at a pier. You can compensate for this error by offsetting chart position.

- 1) Press the **MENU** key.
- 2) Press the **0** key to select "CHART OFFSET."
- 3) Press the right arrow key to select "Cursor."

CHART OFFSET	
Chart Offset	Off Cursor (00.000'N 00.000'E)
Geodetic: TOKYO	
▲▼: Select   ENT: Enter   MENU: Escape	

*Figure 55 CHART OFFSET menu*

- 4) Press the **ENT** key.
- 5) Set the cursor on correct position.
- 6) Press the **ENT** key. The chart offset icon (  ) appears on the display.
- 7) Press the **MENU** key.

To remove the offset, select "Off" in step 3 of the above procedure and press the **ENT** and **MENU** keys.

## Position Offset

You may apply an offset to the GPS position to further refine its accuracy.

- 1) Press the **MENU** key.
- 2) Press the **9** key to select "SYSTEM SETUP."
- 3) Operate the **Arrow** keys to select SYSTEM SETUP menu 2/2, "Position Offset."

Position Offset	00.000'N	00.000'E
▲▼◀▶ : Select ENT: Enter MENU: Escape		

*Figure 56 Display for entry of position offset*

- 4) Enter offset with numeral keys.
- 5) Press the **ENT** key.
- 6) Press the **MENU** key.

"L/L" appears on the display to show that an offset is applied to position. To remove the offset, enter zeroes at step 4 in the above the procedure and press the **ENT** and **MENU** keys.

## 21. DISPLAYING LORAN LOPs

### Overview

Ship's position can be displayed in either latitude and longitude or Loran A or C LOPs. To display position by Loran A or C LOPs, do the following.

- 1) Press the **MENU** key.
- 2) Press the **9** key to select "SYSTEM SETUP."

SYSYTEM SETUP 1/2		▲▼:Next, Previous Page	
Memory Apportion	Trk=4000Pt/8000Pt		
Unit of Distance	<input type="text" value="nm"/>	km	sm
Unit of Depth	<input type="text" value="m"/>	ft	Fa
Unit of Temp	<input type="text" value="°C"/>	°F	
Navaid	<input type="text" value="Int. GPS"/>	Ext. GPS	LC DC All
Scale/ Range	<input type="text" value="Scale"/>	Range	
Rec Resolution	<input type="text" value="2"/>		
Posn Display	<input type="text" value="Lat/Long"/>	<input type="text" value="LOP"/>	
LOP Display	<input type="text" value="LA"/>	LC	No
LA Chain	00-01 Δ +000.0 μs Δ +000.0 μs		
LC Chain	00:11-26 Δ +000.0 μs Δ +000.0 μs		

Figure 57 SYSTEM SETTINGS menu

- 3) Operating the **Arrow** keys, select "Pos Display" to "LOP."
- 4) Operating the **Arrow** keys, select "LOP Display" to "LA" (or "LC").
- 5) Enter Loran A (or Loran C) data with the numeral keys.

#### for Loran A, enter station code

(Station Code)				
00 : 1L0,	01 : 1L1,	02 : 1L4,	03 : 1L5,	04 : 1L6,
05 : 1L7,	06 : 1S1,	07 : 1S2,	08 : 1S3,	09 : 1S4,
10 : 1S6,	11 : 2HS,	12 : 2H4,	13 : 2H5,	14 : 2H6,
15 : 2S0,	16 : 2S1,	17 : 2S2,	18 : 2S3,	19 : 2S4,
20 : 2S5,	21 : 2S6,	22 : 2S7		

Figure 58 Loran A codes

For example, if you are somewhere between Japan Loran A stations 2S3 and 2S4, enter 18-19.

**for Loran C, enter GRI and secondary codes**

CHAIN	GRI	SI	S2	S3	S4	S5
CENTRAL PACIFIC	08 : 4990	11	29	--	--	--
CANADIAN EAST COAST	11 : 5930	11	25	38	--	--
COMMANDO LION (Korea)	12 : 5970	11	31	42	--	--
CANADIAN WEST COAST	05 : 5990	11	27	41	--	--
SOUTH SAUDI ARABIA	16 : 7170	11	26	36	52	--
LABRADOR SEA	13 : 7930	11	26	--	--	--
EASTERN U.S.S.R.	15 : 7950	11	30	46	61	--
GULF OF ALASKA	06 : 7960	11	26	--	--	--
NORWEGIAN SEA	00 : 7970	11	26	46	60	--
SOUTHEAST U.S.	02 : 7980	11	23	43	59	--
MEDITERRANEAN SEA	10 : 7990	11	29	47	--	--
WESTERN U.S.S.R	18 : 8000	10	25	50	65	--
NORTH CENTRAL U.S.	20 : 8290	11	27	42	--	--
NORTH SAUDI ARABIA	17 : 8990	11	25	40	56	69
GREAT LAKES	03 : 8970	11	28	44	--	--
SOUTH CENTRAL U.S.	19 : 9610	11	25	40	52	65
U.S. WEST COAST	04 : 9940	11	27	40	--	--
NORTHEAST U.S.	01 : 9960	11	25	39	54	--
NORTHEAST PACIFIC	09 : 9970	11	30	55	81	--
ICELANDIC	14 : 9980	11	30	--	--	--
NORTH PACIFIC	07 : 9990	11	29	43	--	--

*Figure 59 Loran C codes*

For example, if you are currently in Osaka Bay, Japan, enter 09 (GRI 9970) and 30 and 55.

- 6) Press the **ENT** key.
- 7) Press the **MENU** key.

## Entering LOP Offset

You may wish to offset Loran LOPs shown on the display to further refine position accuracy. After entering Loran chain information, enter offset.

## 22. CUSTOMIZING YOUR UNIT

### Overview

This chapter shows you how to customize your unit to suit your needs. All customizing is done on the **DISPLAY SETUP** menu.

### Procedure

- 1) Press the **MENU** key.
- 2) Press the **1** key to select "DISPLAY SETUP."

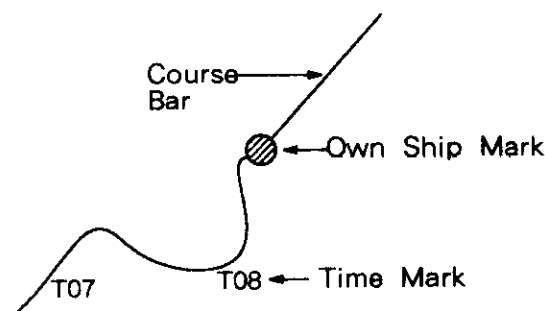
DISPLAY SETUP				
Display	Normal	Reverse		
Land Pattern	Dark	Med	Light	OFF
Place-Name	Dark	Light	OFF	
Grid	Dark	Light	OFF	
Course Bar	Dark	Light	OFF	
Time Mark	Dark	Light	OFF	
MOB Data	ON	OFF		
Waypoint Mark Size	Large	Small		
Mark Size	Large	Small		
Cursor Size	Large	Small		
▲▼▶ : Select    ENT: Enter    MENU : Escape				

*Figure 60 DISPLAY SETUP menu*

- 3) Press the **Arrow** keys to both select item and set option.
- 4) Press the **ENT** key.
- 5) Press the **MENU** key to close the menu.

## Description of DISPLAY SETUP Menu

<b>Display</b>	Select normal (black characters on white background) or reverse tone.
<b>Land Pattern</b>	Select land pattern; hollow or filled (choose tone).
<b>Place-Name</b>	Select tone of place-name shown on chart.
<b>Grid</b>	Select tone of grid.
<b>Course Bar</b>	Select tone of ship's course bar.
<b>Time Mark</b>	Turn time mark on or off.



*Figure 61 Time mark*

<b>MOB Data</b>	Select function of the <b>EVENT MOB</b> key to event mark (OFF) or MOB (ON).
<b>Waypoint Mark Size</b>	Select size of waypoint mark to large or small.
<b>Mark Size</b>	Select size of mark to large or small.
<b>Cursor Size</b>	Select size of cursor to large or small.
<b>Depth Contours</b>	Select tone of depth contours.
<b>Contours Data</b>	Select tone of depth contour's depth figure.
<b>Other Features</b>	Select tone of other chart features; for example, lighthouses, buoys, etc.

## 23. SYSTEM SETTINGS

### Overview

The SYSTEM SETUP menu, menu 9, contains items which do not require frequent adjustment once set.

SYSYTEM SETUP 1/2		▲▼:Next, Previous Page	
Memory Apportion	Trk=4000Pt/8000Pt		
Unit of Distance	<input type="text" value="nm"/>	<input type="text" value="km"/>	<input type="text" value="sm"/>
Unit of Depth	<input type="text" value="m"/>	<input type="text" value="ft"/>	<input type="text" value="Fa"/>
Unit of Temp	<input type="text" value="°C"/>	<input type="text" value="°F"/>	
Navaid	<input type="text" value="Int. GPS"/>	<input type="text" value="Ext. GPS"/>	<input type="text" value="LC DC All"/>
Scale/ Range	<input type="text" value="Scale"/>	<input type="text" value="Range"/>	
Rec Resolution	<input type="text" value="2"/>		
Posn Display	<input type="text" value="Lat/Long LOP"/>		
LOP Display	<input type="text" value="LA"/>	<input type="text" value="LC"/>	<input type="text" value="No"/>
LA Chain	<input type="text" value="00-01 Δ +000.0 μs Δ +000.0 μs"/>		
LC Chain	<input type="text" value="00:11-26 Δ +000.0 μs Δ +000.0 μs"/>		
Smoothing Factor	<input type="text" value="00(0 - 15)"/>		
Spd Average Time	<input type="text" value="01 minute"/>		
Bearing Ref.	<input type="text" value="True Brg"/>	<input type="text" value="Mag Brg"/>	
Mag. Variation	<input type="text" value="Auto(07° W) Man (00° E)"/>		
Output Data Fmt	<input type="text" value="NMEA-180"/>	<input type="text" value="NMEA-183V1.5"/>	<input type="text" value="NMEA-183V2.0"/>
External Device	<input type="text" value="Autopilot"/>	<input type="text" value="Remote Display"/>	<input type="text" value="Navaid"/>
▲▼◀▶:Select      ENT:End      MENU:Escape			

Figure 62 SYSTEM SETUP menu

### Description of SYSTEM SETUP Menu

**Memory Apportion** This unit can store up to 8,000 points of track and marks. The default track storage capacity is 4,000 points. If you want to change track storage capacity to 5,000, for example, enter **5, 0, 0, 0** here.

**Unit of Distance** You may set the unit of distance measurement to nautical miles, kilometers, or statute miles.

**Unit of Depth** The unit of depth measurement can be set to meters, feet, fathoms, hiro, or passi/braza.

**Unit of Temperature** Select Centigrade or Fahrenheit.

<b>Navaid</b>	Select navaid which is to feed position data; internal GPS, external GPS, Loran C, Decca, or All. Select "All" for multiple navaid connection. In this case position data is read in the order of GPS, Loran C, Decca, etc.
<b>Scale/Range</b>	Select chart scale display to scale or range.
<b>Rec Resolution</b>	Set recording interval for automatic plotting.
<b>Posn Display</b>	Select position display method; latitude and longitude or Loran LOPs.
<b>LOP Display</b>	If Posn Display is selected to LOP, enter Loran chain here. For further details, see "21. Displaying Loran LOPs."
<b>Smoothing Factor</b>	<p>Even when the vessel is sailing in a straight line the track shown on the display looks irregular. This is due to signal variation of the external navaid. To smooth out this irregularity, change the smoothing factor here.</p> <p>In the following figure, the actual ship's track is shown by a wide hatched arrow and the position being fed from the navaid is shown by black dots. If no smoothing is applied, the track shown on the display will look irregular due to signal variations.</p>

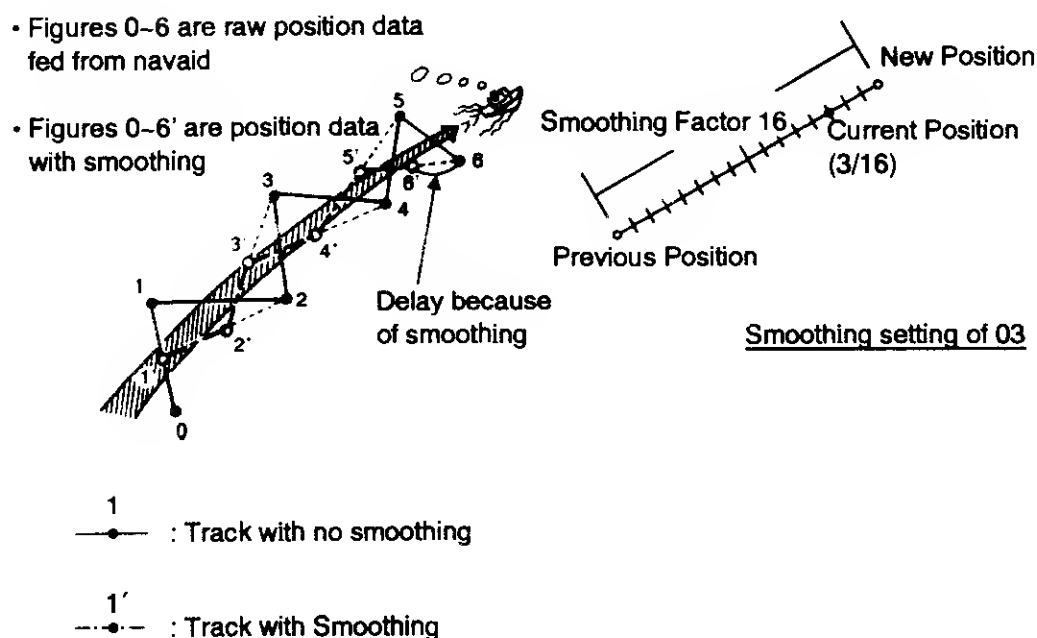
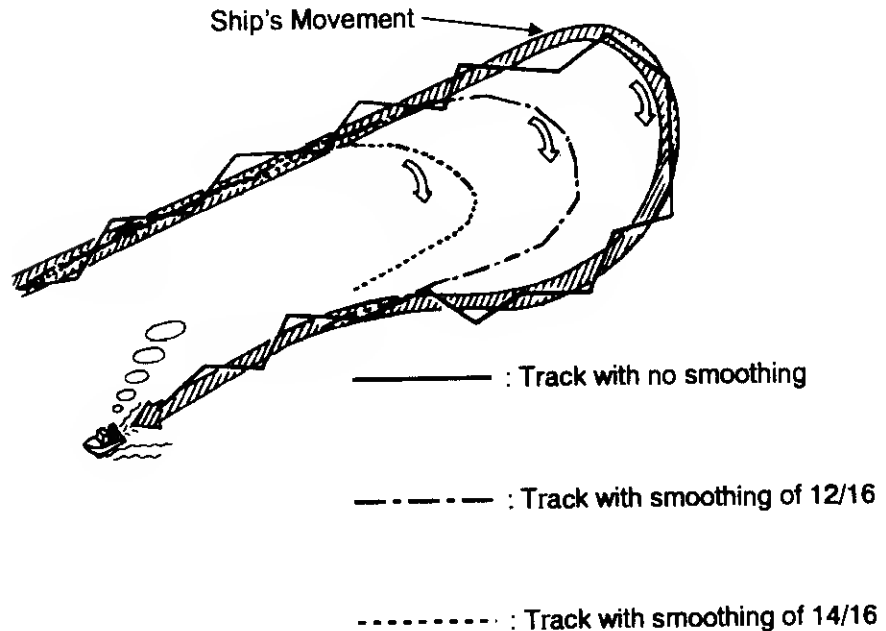


Figure 63 Comparing track with smoothing and no smoothing



For instance, number 03 provides a weighting factor of 13/16 for new data and 3/16 for previous data. The higher the smoothing number, the slower the position update becomes. In the following figure, the track shown by the broken line has a time delay more than the one shown by the dot-dash line, because of higher smoothing factor.



*Figure 64 Comparing track and different smoothing factors*

### **Spd Average Time**

Calculation of ETA and TTG, etc. is based on an average ship's speed over a given period. If the period is too long and the ship's speed is changed suddenly, calculation error will result. The default setting is "01." Increase the setting if time calculations are in error.

### **Bearing Ref.**

You may display bearing data in true bearing (relative to True North) or magnetic bearing (relative to magnetic North).

### **Mag. Variation**

The location of the magnetic pole is different from the geographical North pole. This causes a difference between the true and magnetic North directions. The difference is called magnetic variation, and varies by the observation point on the earth.

This unit is programmed with the earth's magnetic variations. However, you may wish to further refine variation for a particular area. If you enter variation manually, be sure to change it when ship moves to a different area.

## Output Data Format

Select the format of data output to external equipment.

## External Device

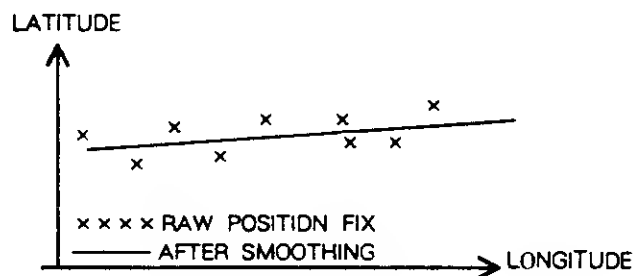
Select external device connected to the GP-1800.

## Time Difference

The GPS uses UTC time. If you would rather use local time, enter the difference in hours between local time and UTC. Use the [ + ] and [ - ] keys for times later or earlier than UTC.

## GPS Posn Smooth

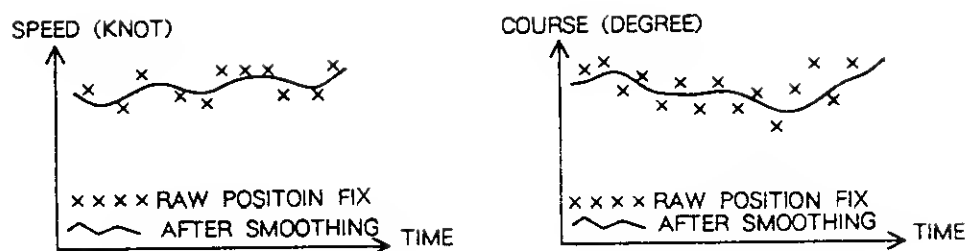
When the DOP or receiving condition is unfavorable, the GPS fix may change greatly, even if the vessel is dead in water. This change can be reduced by smoothing the raw GPS fixes. A setting between 0 and 9 is available. The higher the setting the more smoothed the raw data. Note however that too high a setting slows response time to change in latitude and longitude. This is especially noticeable at high ship's speeds. "0" is the normal setting; increase the setting if the GPS fix changes greatly.



*Figure 65 GPS position smoothing*

## GPS Speed Smooth

During position fixing, ship's velocity (speed and course) is directly measured by receiving GPS satellite signals. The raw velocity data may change randomly depending on receiving conditions and other factors. You can reduce this random variation by increasing the smoothing. Like with latitude and longitude smoothing, the higher the speed and course smoothing the more smoothed the raw data. If the setting is too high, however, the response to speed and course change slows. For no smoothing, enter "0." "5" is suitable for most conditions.



*Figure 66 GPS speed smoothing*

## **Antenna Height**

Enter antenna height above the waterline, for accurate determination of GPS position.

## **DOP Threshold**

This is the index for position-fixing accuracy. When the HDOP threshold is lower than the preset HDOP, position reliability worsens. The default setting is 20, which is suitable for most all conditions.

## **Fix Mode**

Select position-fixing mode. 2D, marine vessels; 3D, land mobile vehicles.

## **Geodetic Datum**

Select the geodetic chart system you are using. WGS-84 (standard GPS chart system), WGS-72 or Tokyo can be directly selected. For other charts, select "Other" and enter chart number referring to "26. Geodetic Chart List."

## **Position Offset**

You may apply an offset to position generated by the internal GPS receiver, to further refine position accuracy.

## **Disabled Satellite**

Every GPS satellite is broadcasting abnormal satellite number(s) in the Almanac. Using this information, the GPS receiver eliminates any malfunctioning satellite from the GPS satellite schedule. Once the malfunctioning satellite is returned to on-line status it is automatically restored to the satellite schedule when the Almanac is received. In some instances however the Almanac may not contain information which announces that a satellite is now back on line. If you hear of this through another source, you can manually restore the satellite to the satellite schedule. This is called "enable." Conversely, you can manually "disable" a healthy satellite if you hear it is "unhealthy."

## **DGPS Mode**

Select to ON if the GP-1800 is connected to a Differential GPS Receiver.

## **RTCM Version, Byte Format, First Bit, Parity Bit, Stop Bit, Bit Rate, Baud Rate**

These are for use by service technicians. Do not change the settings.

## **Clear Memory**

There are times you may wish to clear the Plotter memory or GPS memory (or both) to start afresh. The Plotter memory stores marks, lines, waypoints, routes and settings of the DISPLAY SETUP and SYSTEM SETUP menu. If you wish to restart operation with the items stored in the Plotter memory and your settings on the menus mentioned above, save them to a memory card before clearing the Plotter memory.

### **Procedure**

- 1) Press the **Arrow** keys to select PLT, GPS, or All.
- 2) Press the **ENT** key.
- 3) Press the **ENT** key again to clear.
- 4) Turn off and on the power.

# 24. MAINTENANCE AND TROUBLESHOOTING

## Overview

No machine can perform to the utmost of its ability unless properly maintained. This section provides maintenance and troubleshooting procedures for keeping your unit in good working order.

## Maintenance Program

Regular maintenance is essential for good performance. A maintenance program should be established and should at least include the items listed in the following table.

*Table 3 Recommended maintenance program*

Item	Check Point	Remedy
Antenna	Check for loosened and corroded mounting bolts.	Tighten loosened bolts. Replace heavily corroded bolts.
Antenna cable	Check connection point for watertightness. Check connector for tightness and corrosion. Check cable for damage.	Replace damaged parts.
Display unit connectors	Check for tight connection.	Tighten loosened connectors.
Ground terminal	Check for tight connection and corrosion.	Clean if necessary.
Display unit	Dust and foreign material on the display unit and display screen	Dust on the display screen dims the picture. Remove dust with a soft cloth. The only recommended cleaning agent is anti-static spray. Never use chemical solvents to clean the display unit. They may remove paint and markings.

## Replacement of Fuse

The fuse on the power cable protects the system from reverse polarity of the ship's mains and equipment fault. If the fuse blows, find the cause before replacing the fuse. Be sure to use a 5A fuse. Using the wrong fuse will damage the unit and void the warranty.

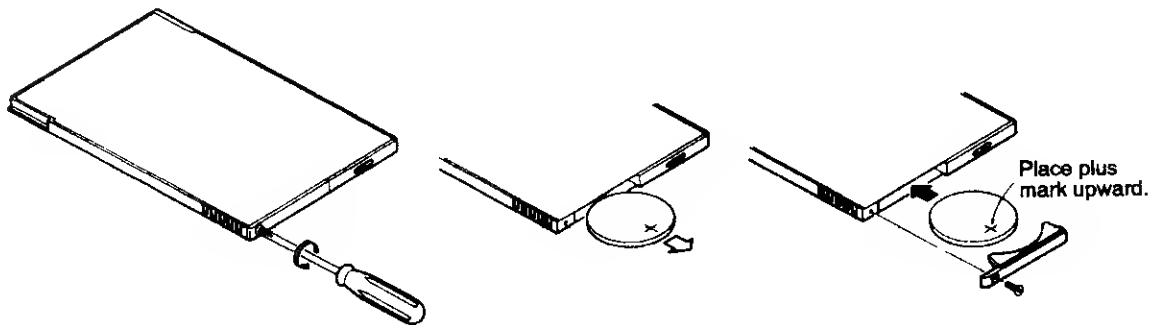
## Replacement of Memory Card Battery

The life of a memory card battery is about three years. The first time you use a memory card record the date on the card. You should replace the battery well before its expected expiration date, so important information stored on the card will not be lost.

**The battery must be replaced within 10 minutes after its removal to prevent erasure of data.**

- 1) Using a jeweler's phillips head screwdriver, unfasten the screw at the base of the card. Remove battery.
- 2) Insert new battery plus side facing up. Refasten cover. Record date of battery replacement on card.

Battery: Type BR-2325, Code No. 000-126-680



*Figure 67 Replacement of memory card battery*

## Troubleshooting Table

The table which follows provides common operating problems and the means with which to restore normal operation. If you cannot restore normal operation by following the recommended procedures, do not attempt to check inside the unit. There are no user-serviceable parts inside. Any repair work is best left to a qualified technician.

*Table 4 Troubleshooting table*

IF...	THEN...
you cannot turn on the power	<ul style="list-style-type: none"> <li>• check for blown fuse (5A) on power cable.</li> <li>• check that the power connector is firmly tightened.</li> <li>• check for corrosion on power cable connector.</li> <li>• check for damaged power cable.</li> </ul>
power is on but nothing appears	<ul style="list-style-type: none"> <li>• press the <b>TONE</b> and then the right and left arrow keys to adjust tone.</li> <li>• several beeps are emitted, turn the power off and on, and press the <b>TONE</b> key several times.</li> </ul>
position is not fixed more than 15 minutes after power is applied	<ul style="list-style-type: none"> <li>• check that the GPS antenna is connected.</li> <li>• check for frequency deviation on the "GPS Monitor" display. (See "GPS Receiver Check.")</li> <li>• check that three GPS satellites are being received; three filled squares should appear at the top right-hand corner of the display.</li> </ul>
the display is showing wrong position	<ul style="list-style-type: none"> <li>• check that the geodetic chart system is properly set on the <b>SYSTEM SETUP</b> menu.</li> <li>• check that the antenna height is properly entered on the <b>SYSTEM SETUP</b> menu.</li> </ul>
position fixing available period is shorter in comparison with other ship's GPS receiver	<ul style="list-style-type: none"> <li>• DOP value is larger than that set on other ship.</li> </ul>
ship's track is not plotted	<ul style="list-style-type: none"> <li>• plotting of track is stopped. Press the <b>PLOT ON/OFF</b> key to resume plotting, if "H" appears at the left-hand side of the display.</li> </ul>
wrong bearing appears	<ul style="list-style-type: none"> <li>• check that magnetic variation entered on the <b>SYSTEM SETUP</b> menu is correct.</li> </ul>
no Loran LOPs appear	<ul style="list-style-type: none"> <li>• check that proper Loran chains are entered.</li> </ul>

*(Continued on next page)*

IF...	THEN...
wrong Loran LOPs indicated	<ul style="list-style-type: none"> <li>• check that proper correction value is entered.</li> </ul>
ship's speed display is not zero after ship is stopped	<ul style="list-style-type: none"> <li>• try to decrease ship speed smoothing factor.</li> </ul>
nothing happens when keys are pressed	<ul style="list-style-type: none"> <li>• turn off and on the power.</li> </ul>
you cannot save data to a memory card	<ul style="list-style-type: none"> <li>• the card may be write protected.</li> <li>• the card may be defective.</li> </ul>

## Self-Tests

This unit contains various self-tests which check the display unit and antenna unit for proper operation. Self-tests may be selected on the SELF-TEST menu. You can display the SELF-TEST menu by pressing **MENU** and **8**.

SELF – TEST
1. GPS Monitor Display
2. Memory, I/ O Port Test
3. Keyboard Test
4. Test Pattern
5. Automatic Testing
Program No. : 1450538103
▲▼ : Cursor      ► : Select      MENU: Escape

*Figure 68 SELF-TEST menu*



## Memory, I/O port test

This test conducts a general check of the display unit and the antenna unit. Press the **2** key at the SELF-TEST menu to start the test. The unit displays the check results for each device or component as either "OK" or "NG" (No Good). The following figure shows sample memory, I/O port test results. Note that nothing appears for SIO AUX.

Memory, I/O Port Test	
ROM	OK
SRAM	OK
VRAM	OK
Memory Card	OK
Internal Battery	OK
Card Battery	OK
SIO(GPS)	OK
SIO(AUX)	
MENU: Escape	

*Figure 69 Sample memory, I/O port test results*

## Keyboard test

This test checks each front panel key for proper operation.

- 1) Press the **3** key at the SELF-TEST menu to start the test.

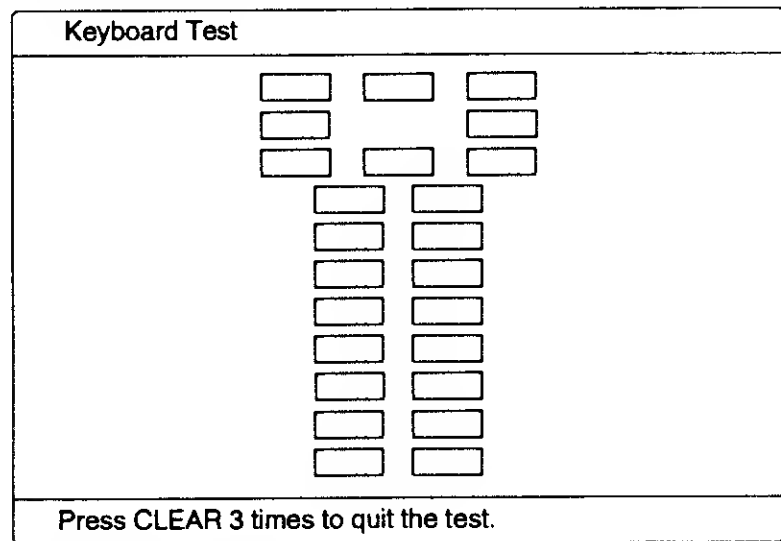


Figure 70 Keyboard test

- 2) Press a key. The key's location on the display "lights" in dark tone if the key is functioning normally.
- 3) To escape, press the **CLEAR** key three times.

## Test pattern

The test patterns check whether the display circuit is working properly or not. Press the **4** key at the SELF-TEST menu to start the test. Press the **ENT** key to display other test patterns.

## Automatic testing

This test continuously executes the memory, I/O test, keyboard test and test pattern self-tests. Press the **5** key at the SELF-TEST menu to start the test. You may escape at anytime by pressing the **MENU** key. Note that several seconds elapse between tests.

## GPS Receiver Check

- 1) Press the **MENU** key.
- 2) Press the **8** to select "SELF-TEST."
- 3) Press the **1** key to select "GPS Monitor Display"

GPS Monitor Display				
Fix Mode	2D	Altitude	--- m	
DOP	1.3	Unhlthy Sat		
Freq. Dev.	- 270Hz	Program No.		
RX Status				
	No.	ELV	AZM	LVL
	03	28	034	89
	14	05	000	27
	18	08	321	38
	11	11	196	11
Data RX:		Ref Sta:		
MENU: Escape				

*Figure 71 Sample GPS monitor display*

### Description of receiving status display

The following tables explains the meaning of the indications on the receiving status display.

*Table 5 Description of GPS monitor display*

Indication	Description
Fix Mode	This shows current position-fixing mode; 2D, 3D, and D2D, D3D (DGPS mode turned on).
Altitude	Shows present altitude of GPS receiver when position fixing mode is set to 3D.
DOP (Dilution of Precision)	This is the index for position-fixing accuracy. The lower the value the higher the accuracy. If the index exceeds 20, position fixing may not be possible.
Unhlthy Sat.	Unhealthy satellite numbers appear here.
Freq. Dev.	If this figure exceeds $\pm 3000$ Hz, it may take a long time to fix position.
Rx Status	This section shows elevation angle, azimuth and signal levels.
Data Rx	Shows extenal Nav device normal or abnormal.
Ref Sta	Shows status of DGPS transmitting station.

## GPS Receiver Status Indicator

The GPS receiver status is shown on the top right-hand corner on the display. In the normal state, three squares filled appears and reliable position fixing is performed. The table below explains about the GPS receiver status indicated by three characters.

*Table 6 GPS receiver status indicator*

<b>GPS Receiver Status Indicator</b>	<b>Descriptions</b>
ACQ:	indicates that the GPS receiver is acquiring the GPS satellites referring to the Almanac. If it remains unchanged for a long period of time, the GPS satellite signals may be not received.
ALM:	indicates that the GPS receiver is collecting the Almanac of the GPS satellites being broadcast from each satellite. The Almanac contains estimated arrival time of all GPS satellites. If the unit is not operated for a while and the Almanac becomes too old, the GPS receiver cannot pick up the GPS satellite for a long period of time with "ACQ" indicated. In this state, cold start the GPS receiver to collect the latest Almanac using the SYSTEM SETUP menu, Memory Clear.
CST:	indicates the GPS receiver is cold starting to collect the latest Almanac. This is performed on the first power application or after clearing memory contents using the SYSTEM SETUP menu, Memory Clear.
IMP:	Impossible to receive satellite signals. Check the antenna unit is not blocked by any obstacles within line-of-sight.
INT:	Position fixing is interrupted with a loss of necessary satellite signals. Position fixing is resumed when lost satellite signal reappears.

## 25. SPECIFICATIONS

---

### DISPLAY UNIT

Display Type	8-inch monochrome LCD, 640 × 480 dot
Display Tone	Three levels

### GPS RECEIVER

Receiver Format	8 channels, all in view
Tracking System	Parallel
Accuracy	Horizontal: 15 m RMS(2D, HDOP ≤3 SA OFF) Velocity: 0.1 kt RMS(2D, HDOP ≤3 SA OFF) <i>GPS accuracy controlled by U.S. Department of Defense.</i>

### PLOTTER SECTION

Chart Projection	Mercator (85° latitude or below)
Track + Mark Storage Capacity	8,000 pts
Waypoint Storage Capacity	198 pts. + external waypoint + starting waypoint
Route Storage Capacity	10 routes, 30 points per route
Alarms	Arrival, anchor watch, border, XTE (cross track error), ship's speed, water temperature

### EXT. NAVAID I/O DATA FORMAT

Input Format	NMEA 0183, Ver. 1.5 or 2.0
Output Format	NMEA 0180, NMEA 0183, Ver. 1.5 or 2.0

### DIMENSIONS (mm) AND WEIGHT

Display Unit: 308(W) × 198(H) × 120(D), 2.4 kg  
Antenna Unit: ø90 × 50(H), 300 g

## **POWER SUPPLY AND POWER CONSUMPTION**

10.2 – 30 VDC, 15 W

## **USABLE TEMPERATURE**

Display Unit: 0°C – 50°C  
Antenna Unit: -30°C – 70°C

## **WATERPROOFING SPECIFICATIONS**

IEC529 IPX5 (display unit), IPX6 (antenna unit)

# 26. GEODETIC CHART LIST

001 : WGS84		086 : NAMIBIA	: Namibia
002 : WGS72		087 : MAPARIMA, BWI	: Trinidad and Tobago
003 : TOKYO	: Mean Value (Japan, Korea, and Okinawa)	088 : NORTH AMERICAN 1927	: Western United States
004 : NORTH AMERICAN 1927	: Mean Value (CONUS)	089 :	: Eastern United States
005 : EUROPEAN 1950	: Mean Value	090 :	: Alaska
006 : AUSTRALIAN GEODETIC 1984	: Australia and Tasmania Island	091 :	: Bahamas (Excluding San Salvador Island)
007 : ADINDAN	: Mean Value (Ethiopia and Sudan)	092 :	: Bahamas : San Salvador Island
008 :	: Ethiopia	093 :	: Canada (Including Newfoundland Island)
009 :	: Mali	094 :	: Alberta and British Columbia
010 :	: Senegal	095 :	: East Canada
011 :	: Sudan	096 :	: Manitoba and Ontario
012 : AFG	: Somalia	097 :	: Northwest Territories and Saskatchewan
013 : AIN EL ABD 1970	: Bahrain Island	098 :	: Yukon
014 : ANNA 1 ASTRO 1965	: Cocos Island	099 :	: Canal Zone
015 : ARC 1950	: Mean Value	100 :	: Caribbean
016 :	: Botswana	101 :	: Central America
017 :	: Lesotho	102 :	: Cuba
018 :	: Malawi	103 :	: Greenland
019 :	: Swaziland	104 :	: Mexico
020 :	: Zaire	105 : NORTH AMERICAN 1983	: Alaska
021 :	: Zambia	106 :	: Canada
022 :	: Zimbabwe	107 :	: CONUS
023 : ARC 1960	: Mean Value (Kenya, Tanzania)	108 :	: Mexico, Central America
024 :	: Kenya	109 : OBSERVATORIO 1968	: Corvo and Flores Islands (Azores)
025 :	: Tanzania	110 : OLD EGYPTIAN 1930	: Egypt
026 : ASCENSION ISLAND 1958	: Ascension Island	111 : OLD HAWAIIAN	: Mean Value
027 : ASTRO BEACON "E"	: Two Jima Island	112 :	: Hawaii
028 : ASTRO B4 SOR. ATOLL	: Tern Island	113 :	: Kauai
029 : ASTRO POS 71/4	: St. Helena Island	114 :	: Maui
030 : ASTRONOMIC STATION 1952	: Marcus Island	115 :	: Oahu
031 : AUSTRALIAN GEODETIC 1986	: Australia and Tasmania Island	116 : OMAN	: Oman
032 : BELLEVUE (IGN)	: Etate and Erromango Islands	117 : ORDNANCE SURVEY OF GREAT BRITAIN 1936	: Mean Value
033 : BERMUDA 1857	: Bermuda Islands	118 :	: England
034 : BOGOTA OBSERVATORY	: Colombia	119 :	: England, Isle of Man, and Wales
035 : CAMPO INCHAUSPE	: Argentine	120 :	: Scotland and Shetland Islands
036 : CANTON ISLAND 1966	: Phoenix Islands	121 :	: Wales
037 : CAPE	: South Africa	122 : PICO DE LAS NIVIES	: Canary Islands
038 : CAPE CANAVERAL	: Mean Value (Florida and Bahama Islands)	123 : PITCAIRN ASTRO 1967	: Pitcairn Island
039 : CARTHAGE	: Tunisia	124 : PROVISIONAL SOUTH CHILEAN 1963	: South Chile (near 53° S)
040 : CHATHAM 1971	: Chatham Island (New Zealand)	125 : PROVISIONAL SOUTH AMERICAN 1856	: Mean Value
041 : CHUA ASTRO	: Paraguay	126 :	: Bolivia
042 : CORREGO ALEGRE	: Brazil	127 :	: Chile : Northern Chile (near 18° S)
043 : DJAKARTA (BATAVIA)	: Sumatra Island (Indonesia)	128 :	: Chile : Southern Chile (near 43° S)
044 : DOS 1968	: Gizo Island (New George Islands)	129 :	: Colombia
045 : EASTER ISLANDS 1967	: Easter Island	130 :	: Ecuador
046 : EUROPEAN 1950 (Cont'd)	: Western Europe	131 :	: Guyana
047 :	: Cyprus	132 :	: Peru
048 :	: Egypt	133 :	: Venezuela
049 :	: England, Scotland, Channel, and Shetland Islands	134 : PUERTO RICO	: Puerto Rico and Virgin Islands
050 :	: England, Ireland, Scotland, and Shetland Islands	135 : DATAR NATIONAL	: Datar
051 :	: Greece	136 : OORNOO	: South Greenland
052 :	: Iran	137 : ROME 1940	: Sardinia Islands
053 :	: Italy : Sardinia	138 : SANTA BRAZ	: Sao Miguel, Santa Maria Islands (Azores)
054 :	: Italy : Sicily	139 : SANTO (DOS)	: Espirito Santo Island
055 :	: Norway and Finland	140 : SAPPER HILL 1943	: East Falkland Island
056 :	: Portugal and Spain	141 : SOUTH AMERICAN 1969	: Mean Value
057 : EUROPEAN 1879	: Mean Value	142 :	: Argentina
058 : GANDAJIKA BASE	: Republic of Maldives	143 :	: Bolivia
059 : GEODETIC DATUM 1849	: New Zealand	144 :	: Brazil
060 : GUAM 1963	: Guam Island	145 :	: Chile
061 : GUX 1 ASTRO	: Guadelcanal Island	146 :	: Colombia
062 : HJORSEY 1955	: Iceland	147 :	: Ecuador
063 : HONG KONG 1963	: Hong Kong	148 :	: Guyana
064 : INDIAN	: Thailand and Vietnam	149 :	: Paraguay
065 :	: Bangladesh, India, and Nepal	150 :	: Peru
066 : IRELAND 1965	: Ireland	151 :	: Trinidad and Tobago
067 : ISTS 073 ASTRO 1969	: Diego Garcia	152 :	: Venezuela
068 : JHONSTON ISLAND 1961	: Johnston Island	153 : SOUTH ASIA	: Singapore
069 : KANDAWALA	: Sri Lanka	154 : SOUTHEAST BASE	: Porto Santo and Madeira Islands
070 : KERQUELEN ISLAND	: Kerguelen Island	155 : SOUTHWEST BASE	: Feiel, Graciosa, Pico, Sao Jorge, and Terceira Islands
071 : KERTAU 1948	: West Malaysia and Singapore	156 : TIMBALAI 1948	: Brunei and East Malaysia (Sarawak and Sedah)
072 : LA REUNION	: Mascarene Island	157 : TOKYO	: Japan
073 : L.C. 5 ASTRO	: Cayman Brec Island	158 :	: Korea
074 : LIBERIA 1964	: Liberia	159 :	: Okinawa
075 : LUZON	: Philippines (Excluding Mindanao Island)	160 : TRISTAN ASTRO 1968	: Tristan da Cunha
076 :	: Mindanao Island	161 : VITI LEVU 1916	: Viti Levu Island (Fiji Islands)
077 : MAHE 1971	: Mahe Island	162 : WAKE-ENIWETOK 1860	: Marshall Islands
078 : MARCO ASTRO	: Salvags Islands	163 : ZANDERIJ	: Sunname
079 : MASSAWA	: Eritrea (Ethiopia)	164 : BUKIT RIMPAH	: Bangka and Belitung Islands (Indonesia)
080 : MERCHICH	: Morocco	165 : CAMP AREA ASTRO	: Camp Mcmurdo Area, Antarctica
081 : MIDWAY ASTRO 1961	: Midway Island	166 : G. SEGARA	: Kalimantan Islands (Indonesia)
082 : MINNA	: Nigeria	167 : HERAT NORTH	: Afghanistan
083 : NAHRWAN	: Masirah Island (Oman)	168 : HU-TZU-SHAN	: Taiwan
084 :	: United Arab Emirates	169 : TANANARIVE OBSERVATORY	: 1925 : Madagascar
085 :	: Saudi Arabia	170 : YACARE	: Uruguay

## A

Alarms	51 - 53
deleting aural and visual alarms	53
description	51 - 52
disabling	53
enabling	53
Anchor watch alarm	51
Antenna height	68
Arrival alarm	51

## B

Battery replacement (memory card)	71
Border alarm	52
Brilliance	
adjusting display	16

## C

Cancel	
destination	36
route navigation	42
CENTER key	20
Chart icons	18
Chart offset	58
Chart scale	65
Clearing the memory	69
Coastline data card	
depth contours tone	63
displaying	18 - 19
grid on/off	63
inserting	15
land pattern tone	63
offsetting position	58
place name on/off	63
Control description	5
Course-up presentation	22
Cross track error alarm	52
Cursor	
function	17
size	63
Cursor key	17

## D

Data displays	
description	21
sample displays	8 - 9
selecting	21
Delete	
data on memory card	57

route waypoints	40
waypoints through waypoint list	33
Disabling/enabling satellites	68
Display scale selection	18 - 19
DISPLAY SEL key	21
DISPLAY SETUP menu	
description	63
DOP threshold	68

## E

Enter	
comments for waypoints	30
marks	43
routes through the route list	38
waypoints by cursor	31
waypoints by event position	29
waypoints by ship's position	31
waypoints through waypoint list	32
Erase	
all marks	46
event/MOB marks	50
individual marks	46
marks in specific area	47
track	27 - 28
EVENT MOB key	48 - 50
Event/MOB marks	
erasing	50
shape	50
Event/MOB position	
entering	49
setting as destination	50
storage capacity	48
viewing past	49
waypoint entry	29

## F

Fix mode	68
Formatting memory cards	54
Fuse replacement	71

## G

Geodetic chart list	80
Geodetic datum	68
GPS receiver status	6, 77

## H

Hide waypoints	34
----------------	----



## K

Keyboard test ..... 75

## L

Land pattern ..... 63

Loran LOPs

displaying ..... 60 - 61

entering offset ..... 61

## M

Magnetic bearing ..... 66

Maintenance ..... 70

Marks

changing shape ..... 44

changing size ..... 43

changing tone ..... 44

connecting ..... 45

defined ..... 43

entering ..... 43

erasing all ..... 46

erasing in specific area ..... 47

erasing individual ..... 46

Memory

apportioning ..... 64

clearing ..... 69

Memory card

battery replacement ..... 71

deleting data ..... 57

formatting ..... 54

recording ..... 55

replaying ..... 56

write protecting ..... 56

Memory, I/O port test ..... 74

Menu

selecting menu items, registering options 24

selecting menus ..... 23

MENU key ..... 23

MOB function

enabling ..... 49

## N

Navaid selection ..... 65

North-up presentation ..... 22

## O

Offsetting GPS position ..... 59

Output data format ..... 67

## P

Plotter displays

example displays ..... 6 - 7

selecting ..... 21

Position smoothing (GPS) ..... 67

Presentation mode ..... 22

## R

Receiving status display

description ..... 76

Recording data ..... 55

Replaying data ..... 56

Routes ..... 37 - 42

cancelling route navigation ..... 42

changing position data of route

waypoints ..... 40

defined ..... 37

deleting route waypoints ..... 40

entering through the route list ..... 38

following cursor-created route ..... 40

following preregistered route ..... 41

restoring route waypoints ..... 39

skipping route points ..... 39

## S

Self-tests ..... 73 - 75

keyboard test ..... 75

memory, I/O port test ..... 74

receiving status display ..... 76

test pattern ..... 75

Ship's speed alarm ..... 52

Specifications ..... 78 - 79

Speed smoothing (GPS) ..... 67

SYSTEM SETUP menu ..... 64

## T

Test pattern ..... 75

Time mark ..... 63

Tone

adjusting display ..... 16

Track

erasing ..... 27

recording interval ..... 25 - 26

smoothing ..... 65

stopping/resuming recording ..... 25

Troubleshooting table ..... 72

True bearing ..... 66

Typographic conventions ..... 3

## U

Units of measurement ..... 64

## W

Water temperature alarm .....	52
Waypoints .....	29 - 36
cancelling destination .....	36
changing data .....	33
defined .....	29
deleting by cursor .....	33
deleting through waypoint list .....	33
entry by cursor .....	31
entry by event position .....	29
entry by ship's position .....	31
entry through waypoint list .....	32
hiding/showing .....	34
setting destination by cursor .....	34
setting destination by waypoint number .....	35
storage capacity .....	29